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ABSTRACT

The long-range goal of the Twin Lakes/Purdue project is to establish a collaborative site where college students can observe and practice teaching behaviors that enhance thinking skills and facilitate cognitive growth. A more immediate objective is to help teachers at the site develop teaching strategies which enhance thinking in the content area of social studies. Efforts have been focused on helping these teachers make a transition from conventional teaching to teaching guided by a research based instruction model. According to the model, instruction is initiated through confrontations, experiences which are emotionally compelling and open to a variety of interpretations. These questions which the teacher asks should help the students seek explanatory relationships. This will lead to using resources beyond the textbooks as the inquiry unfolds. Teachers must encourage students to pursue their own emerging lines of inquiry in this process. The accomplishments and positive aspects of this close relationship between university and school are discussed, as are the difficulties in implementing such programs that force teachers to confront their instructional assumptions and strategies. The aim of this process is to develop the students' abilities to attain skills that will enable them to encounter their environment, probe and process the information discovered, build new constructs, and reorganize the cognitive structure. Student questionnaires, 44 references, and profiles of components of the program are included. (PPB)

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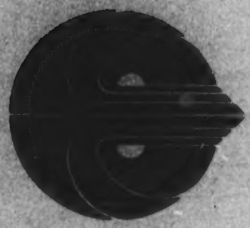

Twin Lakes
Purdue

Enhancing Thinking Skills

FINAL REPORT
October 31, 1988

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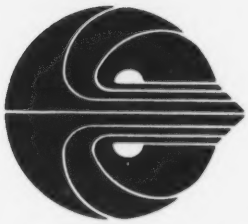

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William McInerney

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CONTENTS

Acknowledgements

Part I Project Portrayal.....1-36

A Collaborative Enterprise for Improving Teacher Preparation

Part II Program Assessment Report.....1-101

The Development of Collaborative Teacher Training

Appendix A - Student Interview Schedule

Part III Practice Profile.....1-10

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This project would not have succeeded without the participation and assistance of many people. We would like to offer thanks and acknowledgement to these colleagues at Twin Lakes and Purdue.

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Part I

Project Portrayal

A Collaborative Enterprise for Improving Teacher Preparation

The Twin Lakes/Purdue Thinking Skills Project: A Collaborative Enterprise for Improving Teacher Preparation

Introduction

The long-range goal of the Twin Lakes/Purdue project is to establish a collaborative site where college students can observe and practice teaching behaviors that enhance thinking skills and facilitate cognitive growth. A more immediate objective is to help teachers at the site develop teaching strategies which enhance thinking in the content area of social studies.

The Twin-Lakes School Corporation, the site of our work, is located in Monticello, Indiana, 30 miles north of Lafayette. Monticello is a community of about 6,000 people serving as the commercial center for the surrounding agricultural area. It is the county seat of White County, which has about 24,000 inhabitants. Lake Shafer and Lake Freeman are popular boating and recreational lakes, and a summer tourism industry has developed around these facilities.

Monticello is a clean, pleasant, busy community. In 1974, a tornado swept through the center of the town destroying some of the schools and the downtown business district. As a consequence, the school facilities are comparatively new and the town is a mixture of modern buildings and more traditional architecture. The citizens as a whole are conservative in their views on religious, political, social and educational issues.

The Superintendent of the Twin Lakes schools, Dr. Rodney Rich, is an important reason for the project being located in Monticello. He administers the work of four elementary schools, a middle school and a high school from a central office in a restored elementary school building dating from the 1800's. His reception area, board room and private office are paneled in mellowed cherry. Old wood cuts and the diplomas of a by-gone era decorate the walls. Dr. Rich is progressive, energetic and deeply committed to the improvement of education within his system. For Dr. Rich, the collaborative effort is seen as an opportunity for sustained university support in the development of his faculty.

In many ways, the Twin Lakes School Corporation is an ideal choice for the collaborative project. The district is far enough away that Purdue is not a constant presence, but close enough that we can put students there. Twin Lakes is reasonably representative of school corporations in small towns throughout the country. New instructional strategies and new structures for teacher preparation which work in Monticello should work in a large number of communities across the nation.

Within this setting, we are working with 19 social studies teachers in grades five through 12. This group constitutes every social studies teacher in the system. Our efforts have been focused on helping these teachers make a transition from conventional teaching to teaching guided by a research based instructional model. Additionally, we have placed student

observers and practice teachers at the site, and we have formed a team of teachers and professors who jointly taught our secondary social studies methods course in Monticello.

The Instructional Model

The instructional model guiding our efforts has been fully described elsewhere (McDaniel & Lohmann, 1987). A brief description of the major components of the model is provided here to communicate something of the shift in teaching behavior which was expected of the teachers.

The first component of the model builds on the notion that information processing takes place in a context of uncertainty (Berlyne, 1960). That is, the learner is most likely to process, extend and apply information when confronted with situations that require interpretation or explanation. According to the model, instruction is initiated through "confrontations," experiences which are emotionally compelling and open to a variety of interpretations.

The second component of the model focuses on the kind of questions which the teacher can ask to help students seek explanatory relationships. These questions lead the students to use information to reach underlying concepts and broad generalizations, the organizing ideas of the discipline. Such questions stand in contrast to the usual recitational queries and reflect Taba's (1966) notion that teachers can "lift the level of thought" through questioning.

The third component of the model draws attention to the need to go beyond textbooks in providing resources which are responsive to questions which students ask as their inquiry unfolds. In order for students to pursue their ideas, they need specialized reference materials, resource people, supplies, and opportunities for reflection, discussion, data collection, and analysis.

The fourth component of the model stresses the functions of personalized planning by the teacher to encourage students to pursue their own emerging lines of inquiry. With personalized planning, the inquiry processes are more likely to be centered on student concerns and to be in touch with student goals, interests and needs.

The following example may serve to illustrate the teaching behaviors suggested by the model. A unit on the Civil War might be introduced by presenting three divergent accounts of the same battle. The accounts invite interpretation and resolution of the discrepant reports. The teacher moves the discussion into deeper levels by asking students to establish criteria by which eye-witness accounts can be judged. As students begin to formulate their own tentative notions about what happened, additional reports and interpretive accounts are provided so that students can continue to elaborate their initial interpretations. Finally, the teacher encourages individual projects which allow students to continue their own emerging lines of inquiry.

The complete theoretical model contains a number of testable propositions. For example, the model specifies that instructional content will be processed at deeper cognitive levels (as defined by Craik & Lockhart, 1972) when instruction is related to student interests and initiated by confrontations which highlight the ambiguity and uncertainty which is to be resolved.

Encouraging Teachers to Use the Model

While it may be relatively easy to gain verbal acceptance of this model, changing the behavior of teachers was not a simple task. Weil and Joyce (1978) report that it may take five or six trials before a teacher can comfortably handle unfamiliar models in the class room.

Our strategy in introducing the model to the teachers was to ask each teacher in the project to design and teach four "demonstration lessons" based on the instructional model. To support this enterprise, we conducted inservice training and requested that teachers work with planning sheets specifically designed to draw attention to the components of the model. Both the planning and the presentation of the demonstration lessons were monitored and individual feed-back was provided for each teacher.

We have had some remarkable successes in this project. In one case, a teacher donned a World War I uniform and portrayed Sergeant York as a way of stimulating students' thinking about the meaning of Veteran's day. At an elementary school, three

teachers combined forces to provide "eye witness" reports of the Incas' encounter with the Spanish conquistadores. At another elementary school, students waved small American flags as "President Truman" arrived in a 1940's convertible to talk with the fifth grade class about his decision to drop the bomb. At the middle school, discussion of the Depression was initiated by a true Depression meal eaten in the classroom. At the high school, an actor portrayed a member of the Lewis and Clark expedition using extensive passages from the actual journals.

On the other hand, teacher involvement in the project and change in their teaching behavior has been uneven. Some teachers more than others grasped the fact that the presentation of ambiguity was a key factor in stimulating students to process information. Some teachers more than others were willing to depart from lectures and open their classes to small group discussions. Some teachers more than others were willing to assemble materials that went beyond the text. Some teachers more than others developed skill in using questions to encourage deeper probing of the material.

While our instructional model was designed to encourage students to use content and to arrive at some of the "big ideas" within the content areas, it was generally perceived as conflicting with content coverage. A Twin Lakes teacher: "We found the time commitments to the project lessons more than we anticipated. With a chronological U.S. History program beginning approximately at the American Revolution, we will not complete

WWII, much less get up to the present. We can't cover the content we feel necessary in two semesters as it is, and using the inquiry model makes this even more difficult. The Purdue staff stresses the value of process over content, but we still feel pressure to cover the traditional course materials."

Teachers became anxious even when they accomplished much that we considered valuable. After an exemplary unit in which two fifth grade classes became the North and the South of Civil War days, studying the way of life and producing their own newspapers, the teacher commented that the unit "took too much time and kept me from covering the material I had to cover." As the project moved through the three-year cycle, teachers at the elementary and middle school levels became far more accepting of the value of thinking skills lessons than did the teachers at the high school. A middle school teacher: "You get more kids involved with a thinking skills lesson than a traditional one." An elementary teacher: "One problem we always have is the students who just aren't listening because they never have the right answer. And in this project we're working so that each child gains an answer for himself." This is perhaps a function of the generally more child-centered educational philosophy often found at the lower grades. As Clark and Peterson (1986) remind us, innovations which conflict with teachers' beliefs are not likely to be warmly received.

On balance, the developments among the staff at the Twin-Lakes schools were positive. As described by the on-site project

coordinator who was probably more closely in touch with the working lives of the teachers than anyone else, the project had the following impact on teachers.

1) The site teachers involved in the project have, to a greater degree, taken into consideration student interests when planning and implementing the various units.

2) Teachers have also been more attentive to and aware of the available outside resources and materials, other than the textbook, in the planning of units of study.

3) Teachers reported that they paid more attention to detail and organization in planning and in implementing the lessons.

4) Teachers related that they had actually organized some units of study for their classes that they had wanted to put together for quite a while but had never taken the time.

Overall, there seemed to be improved planning involved in the demonstration lesson procedure. Teachers stated that the time lines set by the project helped "thoughts become action" as they developed lessons and units that had previously been only ideas. Several of the demonstration lessons revealed that the teachers involved in the project were challenging traditional methods and were actually attempting at various levels to try new strategies and methods.

Rationale for Staff Development

It may seem that an inordinate amount of time and effort has been devoted to a particular school system in the name of teacher education. Indeed, this is the case. Our experience thus far leads us to believe that staff development in collaborating sites is a critical prerequisite to the improved teacher preparation programs of the future.

The reasons for this statement are not hard to find. Lanier and Little (1986) contend that current field experiences in teacher preparation programs foster a "group management" orientation (emphasis on student management) rather than an "intellectual leader" orientation (emphasis on the developing mind) to classroom work. The Holmes Group report (1986) speaks of practice teachers' easy abandonment of their intellectual grounding as they take on the coloration of their supervising teachers. "Student teachers succeed because they relinquish the norms of professional colleges of education without a struggle" (Tomorrow's Teachers, p.54).

The Holmes group further describes the typical conditions of practicing teaching:

> Mentor teachers are often selected by school officials with little understanding of the particular learnings to be acquired, and with little appreciation for the professional knowledge of competent teachers and teacher educators. University supervision is infrequent. It is common for the practice experience

> to be limited to a single school, classroom, and teacher--all of whom are basically unknown to the university faculty and unfamiliar with other aspects of the teacher education program. Rarely does the experience build upon the general principles and theories emphasized in earlier university study. (p.54)

Lortie (1975) goes on to point out that the value of student teaching may reside mostly in the reassurance that it provides to the student that he or she can actually conduct instruction. As a vehicle for using personal experience for validating theoretic principles, practice teaching does not measure up:

> Because of its casualness and narrow scope, therefore, the usual practice teaching arrangement does not offset the unreflective nature of prior socialization; the student teacher is not forced to compare, analyze, and select from diverse possibilities. The risk is, of course, that practice teaching may simply expose the student to one more teacher's style of work. The value of practice teaching is attested to by many who have participated in it, but there is little indication that it is a powerful force away from traditionalism and individualism. It may be earthy and realistic when compared with education courses; but it is also short and parochial. (p.71)

It is evident that the current state of field experience contrasts sharply with the vision of renewed teacher education

held forth by the Holmes Group (1986) and the Carnegie Forum (1986). Both reports see the emergence of "professional development schools" where, as in teaching hospitals, novices learn their craft by working with skilled professionals in real world settings. The analogy of the teaching hospital holds forth the image of professors, skilled practitioners and novices cooperatively forging best practices. For the schools, the image includes teachers reflecting on goals, selecting among means, reorganizing curricula and experimenting with teaching strategies.

There is a considerable distance between the change proposals of the reformers and the standard operating procedures of teachers. Teachers are not accustomed to examining curriculum and experimenting with teaching strategies, Yet, the emergence of professional teachers exercising autonomy over the ends and means of their craft is a major plank in the reform platform. Collaborations between universities and schools mean the initiation of the slow, gradual process of empowering teachers to take charge of instructional programs now constrained by tradition, convention and custom. Our staff development work in Monticello might be viewed as empowering teachers to take steps toward greater autonomy. If our ultimate goal is to educate future teachers who are reflective decision makers, then this role has to be modeled in the schools where our students do their observations and practice teaching.

The Two Cultures of Schools and Universities

As schools and universities collaborate in attempts to bring such professional sites into being, it seems important not to underestimate the difficulties which must be faced. If we are serious about building professional development schools, then new arrangements will have to be worked out that provide the classroom teachers in such schools with some of the conditions which facilitate reflective thinking: reduced teaching loads, professional books and journals, private offices for study, regularly scheduled seminars or research group meetings, and so on.

Manipulating mechanical arrangements may or may not be sufficient to change the contrasting values which animate the work of the teacher and the professor. It is sometimes the case that teachers are socialized into a service culture; professors into an investigative culture. Granted, this distinction is not invariant (universities have their share of professors who have not "investigated" anything since their dissertations); but where it appears it leads to important differences in the basic epistemology of knowledge about teaching. Bolster (1983) notes: "As I reflect on my work over the past two decades, I recognize that there are two critical differences between how teachers and academic researchers understand the activity of teaching. The first difference lies in how teaching is formulated: how knowledge about teaching is perceived, discovered, and

structured. The second difference lies in how knowledge about teaching is determined: how it is verified or proved" (p. 295).

Bolster goes on to point out that teachers validate their knowledge by what works for their 25 to 30 students, with little interest in whether their particular methods are generalizable. Academics, on the other hand, work within well defined rules for validating knowledge and demonstrating the generalizability of the findings. The conditions for discovering and validating knowledge keep the insights of one group from being of much interest or concern to the other.

Bridging the Gulf

Perhaps these comments are sufficient to suggest that bridging the gulf between the two cultures is an essential part of the agenda of creating new professional schools. Both practice teachers and experienced teachers validate their knowledge in the situations in which they find themselves. Rather than decry this fact, we might consider ways of using these very situations to explore cooperatively alternative propositions about teaching and learning.

To some extent we have done this through requests that teachers at Monticello demonstrate a limited number of lessons based on a particular instructional model. Presented below are parts of the research notes describing a single lesson taught in this context.

Mr. H.'s class began with a debate on the Death Penalty: "Does the punishment fit the crime?" The

students had obviously researched the topic and incorporated statistics into their emotional pleas for the causes for which they stood. Those arguing for the death penalty mentioned the cost of maintaining prisoners and the examples that would be set for others. Those against the death penalty cited the Ten Commandments and pointed out that human life is worth more than the costs involved in keeping a person in prison.

Following the presentations by the debaters, Mr. H. opened the discussion: "What kinds of questions do you need to ask and think about when you try to make your decision?"

After a short discussion, Mr. H. described a hypothetical situation in which a physically abused child waited for the father to come home so he could shoot him. The teacher then asked two questions:

1. What would be a fair punishment?
2. What will prevent him from doing it to someone else?

Student questions generated additional complexities in the problem. "What if someone kills someone and really didn't mean to do it . . . or if someone is convicted and it's the wrong person?" After more discussion, the four debaters were appointed as the small group leaders and each group assigned a task:

1. Develop alternative plans for the death penalty.

2. Determine at what age is the death penalty o.k.

3. Write a letter to the Governor pleading for a reprieve for your son, who has been sentenced to the chair.

4. Write the Governor's response telling why the son cannot be pardoned.

Following the small group sessions the leaders of the groups reported to the class.

Even though the teacher maintained control, the students did have a chance to look into a variety of options. The teacher obviously had carefully chosen his debaters to carry the class through the confrontation. The topic was of interest to the class as a whole. The teacher guided the lesson through planned stages and topics which had been chosen previous to the class session. Individual student concerns were addressed during the sessions. There were also indications that students would have opportunities to further investigate any particular areas of interest they might have during the next couple of class periods. Mr. H. provided several additional readings (which he had laminated) which provided information relevant to problems under discussion rather than pre-digested solutions. Mr. H. mentioned that students might want to write letters to

the state penitentiary to find out actual costs to keep a prisoner on death row.

It should be evident that Mr. H.'s teaching strategy conformed rather closely to the behaviors suggested by the instructional model. Through identification with the debater, other students should have been motivated to take sides. Certainly, ambiguity regarding the death penalty was made explicit. Students were placed in the position of resolving a problem, not remembering information. The teacher's questions seemed to encourage students to consider the problem at deeper levels, and some resource material had been assembled, laminated, and distributed to assist students in testing and extending their ideas. How did the students respond to these arrangements?.

Student 1. Tom. - Attended to students presenting debate. He seemed to be laughing at some internal joke, or was he simply nervous about something? Chewed on pen. Held up hand during class discussion but was not called on. Looked at other students and laughed when a classmate suggested that the mother of a victim should kill the killer. Was called on by the teacher and asked: what happens if a person is found innocent after being executed?

Tom was in the group trying to develop alternatives to the death penalty. He spent the initial part of the group time reading material on the issue from the Junior Scholastic. I was unable to

monitor closely his actions during remainder of small group work.

Tom attended to the student speakers making reports from each group. On the whole, he was reasonably attentive and engaged throughout the class as most other students, and I felt that he had the potential for greater engagement and participation.

Interviewed about the class a week later Tom indicated that he was deciding whether people should be given the death penalty or not and the cost of keeping offenders in jail. Despite the attention shown in class, the interview material suggests that he was not deeply engaged. When asked, "What were you trying to figure out?" he responded, "I don't know, I was just going along with everyone else." Later when asked, "What was the hardest thing you were trying to understand?" he responded, "I don't remember, Everyone was answering all the questions. I didn't have to think." He was still concerned with the question he had asked in class, "What would happen if a person got the death penalty, was actually killed, and later found to be innocent?" Yet, he summarized what he had learned from the lesson as "How much money it takes to keep them in prison . . . lots of money."

In summary, Teacher H. had a thought-provoking confrontation as evidenced by the variety of student-

generated questions. The teacher, however, was not able to capitalize on the student questions as he had planned small group work around predetermined assignments. Within these constraints, students were free to develop their own ideas. There was some indication that there would be opportunities for students to continue their quests in subsequent class periods, but no evidence that they did.

During the interviews, students had difficulty summarizing what they had learned. Some students personalized the lesson rather than generalizing from it, i.e., "if I became mad or angry with someone, I wouldn't try to kill him," and "If you didn't do something bad, don't tell the police that you did . . . ." There is evidence that most students internalized the issue of the death penalty but did not go on to develop well articulated positions.

One can see that these are extremely rich materials. We need to do more, as Bolster suggests, in incorporating teachers into seminar groups engaged in analyses of these lessons. We actually need to go further and find ways of giving teachers a leadership role in using classroom observations and analysis as a means of considering broad questions of instructional strategy.

The Social Studies Methods Class

By the spring of 1988, students in the secondary social studies methods class were making trips to Monticello to work

with the teachers there, and teachers from Monticello were coming to campus to make presentations to the college classes. We have ample evidence that there were large benefits from this arrangement for both the Twin Lakes teachers and the college students. An eighth grade teacher with many years of experience commented on his feelings about being invited to come to Purdue and present to the students in the Social Studies methods course:

> I thoroughly enjoyed the afternoon that I spent with the 406 kids at Purdue. Found it very enlightening for me. Found it very elevating from a professional standpoint for me. Because the first time in 30 years I was something other than an 8th grade junior high teacher talking to 8th grade students. Some other adult people had some interest in what I had to say. And were going to pay attention to it and I was going to have some kind of a mark on a later day teaching in the schools. That's a good feeling.

Our own students in the methods course identified the observations and contacts with the Twin Lakes teachers as the most valuable part of the methods course. The highlight of the course occurred when methods students were put in groups and teamed with Twin Lakes teachers to develop curriculum units which would be taught in the teacher's classroom later in the spring. The students conferred with the teachers as to topics, and met with them frequently as they developed and refined their lessons. The contacts with interested teachers was welcome and the

construction of curriculum units that would actually be used added an important degree of relevance to the work of the students:

> Purdue Student A: The idea of doing this class in conjunction with the Twin Lakes faculty is by far the best thing in it.
>
> Purdue Student B: Most of what I learned in this class was from in-class discussions and interaction with other students. Observations at Twin Lakes were quite helpful and one of the best features of the course.
>
> Purdue Student C: Most effective--visitations from the Twin Lakes faculty . . . interactions with fellow students . . . Activities in smaller groups to work on projects stimulates ideas and makes class more fun because everyone gets to know each other . . . curriculum project . . . This is a very worthwhile project and one which we need to master, since we will be developing unit plans and improving on existing unit plans much of the time . . . .
>
> Purdue Student D: The portion of the course that I think went the best was the contact with the teachers. It was interesting and helpful to be taught by those who were in the classrooms everyday. By talking with the teachers or just listening to them we were better able to get a hold on how the model meets

the classroom in reality. I found it helpful and inspiring to talk with active teachers. I wish we could have worked with them more . . . .

Purdue Student E: Concerning the curriculum project itself, I believe the opportunity to actually try out the project was crucial. It gave me the impetus and guidelines to make the lessons real, usable and not theoretical . . . . This is clearly the most challenging and beneficial education class I have taken.

Purdue Student F: I think one of the most effective activities of the Twin Lakes Project was actually putting together a curriculum unit. I had to really put myself in a classroom mentally in order to prepare my unit. Timing, student interest, and delivery had to be considered.

We will continue to build the social studies methods course around observations and analysis of classes in Monticello and we will be finding ways of maximizing the teacher's involvement in the analysis.

Student Teaching

An unfortunate experience in the fall semester of 1987 sparked a process of reviewing and re-shaping our understanding of student teaching. During the time that a student teacher was "flying solo," without the supervising teacher in the room, a group of students got out of hand and were quite rude to the

student teacher. This persisted over several days. The student teacher did not report this to the supervising teacher, because he thought it reflected badly on his ability to control the class. Finally a student in the class said something to his mother about the behavior. The mother called the superintendent, who began to perceive that between this problem and the need to orient student teaching to critical thinking, now would be a good time to review student teaching generally..

Consequently the superintendent and a Purdue professor drew up a rough draft of a revised student teaching format that would more carefully spell out the student experiences thought desirable, including how the student was to be strengthened in the thinking skills instructional model. This draft was circulated to university and school district staff, who, meeting separately and together, contributed numerous adjustments and suggestions, and from these deliberations a format to govern student teaching in the spring of 1988 emerged.

Three student teachers in social studies from Purdue were assigned to Twin Lakes in the spring of 1988. Many other student teachers were in the district, from Purdue and other universities, in a variety of subject fields and grade levels. All used the revised format. Several new (for us) features of the student teaching experience were occasioned by the document. Students were asked to observe at elementary, middle, and high school grade levels, and in reading and special education classes. Students were introduced to the thinking skills

project, and were asked to utilize techniques from the project in lessons they taught. Finally, supervising teachers were urged to make use of videotaping of lessons as a vehicle for critiquing and analyzing lessons taught.

The student teaching agreement spells out in detail the obligations of the central administration, principal, supervising teacher, and university supervisor, in addition to the student teacher. Twin Lakes teachers hosting student teachers have begun a series of meetings with Purdue staff, developing specific strategies to deliver appropriate experiences. These sessions have served as excellent communication vehicles and opportunities to thrash out a mutual conception of what student teaching ought to be.

Student teaching logs and lesson planning sheets collected from three of the students who were placed in Twin Lakes reveal that the students made considerable progress in applying the instructional model to their teaching. The two strongest aspects of the model for these students were planning the initial confrontation and developing transitional queries. None of the three were as successful as we may have liked in managing student investigations into their own questions, although all made efforts to carry the model through completely.

Selected quotations from their logs demonstrate the concepts with which the students were engaging.

> Student teacher A.: We discussed the New Deal and its implications on American domestic policies. The

"New Deal" is a topic that can provide an excellent "confrontational experience." On the one hand, most will believe the government should provide some kind of financial aid to those who are in need. On the other hand, others will argue with equal fervor that government intervention, especially at the federal level, is nothing short of 'creeping socialism." I hope to be able to "set the stage," especially through the use of questioning strategies, for a confrontation based on these simultaneous but conflicting beliefs. It is my belief that most, if not all, of these students harbor these conflicting beliefs.

Continued our discussion today of the First New Deal. As I expected, a lot of the students volunteered opinions on the role of the government in intervening in the lives of Americans facing severe economic woes. Some students expressed the opinion that the government should have a large role in helping the economically stricken. On the other hand, a few argued that such help would drain the American economy, put the U.S. in debt, and hurt everyone in the long run. To my pleasure, some students were agitated and, consequently, had identified a "problem" of their own.

Student teacher B.: In general, both classes had difficulty understanding that the depression was more than the stock market crash. They fail to see that

history involves the combining of information; events cause a reaction which in turn causes another reaction--the dominoes effect. If students can see how events are intertwined, then they will be able to identify trends better. Hopefully, tomorrow's critical thinking exercise will help them see that the Depression was a chain reaction that was caused by several factors.

Periods 3 & 4 continued to meet in groups and discuss the different points of view. After sitting in on groups and continually explaining what they were to do and how to go about it, I concluded that the exercise may be too deep for them to understand. Some groups did realize that history was a combination of events and were able to come up with good answers. However, most of the groups would not put enough effort into thinking or caring about the causes of the Depression. I took period 7 for the first time today. I expected it to be difficult to teach the last period of the day, especially on a Friday. As it turned out it was the best class of the day. Instead of breaking them up into groups I used the CT [critical thinking] exercise as a class discussion tool. I introduced each view, gave an example and let them develop it and feed me back new information/examples. I found this to be more productive and less time consuming. This might be a better way to handle difficult concepts.

Opportunities and issues

A close collaboration between universities and school districts in the training of teachers has much to recommend it. This paper has suggested some of the possibilities and problems that collaborations hold. As we started the third year of our efforts, in the Fall of 1987, the following accomplishments and continuing issues could be noted.

1. Collaborative arrangements offer a great opportunity to re-work the conditions of preservice teacher preparation so that practice better informs theory and theory comes to be perceived as a powerful tool in manipulating practice. In our case, the collaboration has offered us a chance to work toward a greater consensus on instructional models. While progress has been uneven, there is a commitment of the system as a whole to examine teaching strategies and to encourage attention to thinking processes. While this commitment was in the beginning a decision of the superintendent, Twin Lakes teachers have increasingly over the life of the project taken ownership of the idea of promoting thinking skills. For example, the district won a grant from the State of Indiana's Teacher Quality Program to develop a thinking skills staff development model. Led by an elementary principal, and staffed by teachers from various disciplines and grade levels in addition to social studies, the model has incorporated materials from the project and the district's involvement with the Artist-in-Residence program to develop a conception of staff development in thinking skills across the curriculum. While this

program was certainly influenced by the work in the Twin Lakes-Purdue Thinking Skills Project, it is very much a distinct program, "owned" by the administrators and teachers who have worked on it.

Further, written agreements have been finalized which make explicit the expectations of the student teacher and of the university and school district personnel who guide that student's experiences. Perhaps most radical of all, the expectations specify the instructional model which will guide at least some of the students' planning, teaching and evaluation. Perhaps such agreements should be more common.

2. We have become increasingly aware of the need for a person to act as a broker between the university and the school district. The broker has dimensions of a project manager, but is also a person who trades in ideas and cooperation. We have had a half-time person, funded by Purdue but based in Monticello, who has been able to serve as a communication channel for cares and concerns and substantive matters related to the project. A former teacher, she knows education generally and Twin Lakes in particular. She has assisted teachers in planning, observed lessons, provided feedback, worked out snags and snafus, delivered materials and resources, and generally assisted communication over the barriers of the 30 mile distance separating Purdue from Monticello. In the fall of 1988, a Purdue professor was given one-quarter released time to work with Twin Lakes, attempting to take up as much as he could the duties left

when the on-site coordinator came off the project payroll at the end of the funded period.

More generally, universities entering into collaborations are likely to find that university professors are not going to be available in sufficient number to meet the administrative demands and support services required in coordinating activities between school systems and the university, particularly if those school systems become numerous. It is questionable whether school systems have personnel that can take this coordination on, either. A professional on-site liaison person is essential if efforts of any size are to be well coordinated and to function smoothly. Who this person should be, what his or her standing should be in the school district(s) and the university, how funding could be developed, and similar issues remain to be worked out.

3. It is difficult to determine why some teachers seem willing to try new instructional strategies and some seem resistant. Our project plunged teachers into the behaviors of inquiry teaching before they had a chance to examine the idea of inquiry teaching. Should any innovation be put in place before teachers have a chance to examine it and work out inconsistencies between the behaviors required and their beliefs? What situational and personal factors sway some teachers to "buy in" and other to "opt out"? Our experience suggests that those teachers who already were inclined to inquiry methods have had the greatest success with the instructional model. We also have

seen more emphasis on student-centered assignments at the lower grades. Finally, those teachers who had developed expertise in the use of realia (such as Civil War artifacts, pioneer tools and clothing, antique documents and furniture) to entice students into the study of a historical period have enjoyed success in incorporating that approach into the instructional model.

4. Working with teachers as they attempted "demonstration" lessons based on the instructional model has given us a look into teacher values and attitudes toward instruction and content, and how these affect the ways in which teachers approach classroom work routines. Teacher behavior in many cases appears to reflect their beliefs about what works in keeping things on track, covering the material, and creating a semblance of order and efficiency. A Twin Lakes teacher: "We found it very hard to integrate the results of the project lessons in a traditional percent of points grading system. It was difficult to quantify student achievement and translate these into numerical and letter grades. This would be less of a problem in a pass/fail system, but that option is not available in our school system." Another Twin Lakes teacher: "What if a student spent a lot of time early on on a given subject and couldn't finish the text? He would get to the next text with gaps." It is worth noting parenthetically that regarding the first comment, many teachers in Twin Lakes are quite successful in grading non-traditional student products, and regarding the second, many students apparently pass through 12 or more years of traditional approaches and still manage to be

afflicted with gaps in their knowledge. It is difficult to know at this time how much of this preoccupation with moving through the historical content in a traditional manner is a function of the organizational milieu of the building, or the atmosphere of accountability in which schools operate today, or of a general conception of professional practice which many teachers share (or some combination of these and other factors.) This semblance of order and efficiency does seem to be extremely important to many of the teachers in Twin Lakes and keeps attention focused on the clearly observable variables of teacher and student behaviors rather than on the less obvious variables related to how students are thinking about subject matter.

5. Defining and developing the role of collaborating practitioner teacher trainers remains an unfinished task. The role we have focused on is that of the school based "adjunct professor," who will function partly in the district as teacher, partly in the university as teacher trainer, or as curriculum and instruction specialist, or as provider of field experiences. We have spent three years exploring with the social studies staff of an entire school district the sorts of instructional models and practices which Purdue students will need to master if they are to become reflective teachers capable of focusing on higher order thinking skills in their classrooms. As we move into the future, we will be extending our expectations of these teachers by continuing to involve them in the generation of knowledge and the preparation of teachers. What job titles will be appropriate for

these teachers and what new working conditions will be necessary for them to discharge their roles? From what sources should their salary be paid?

It is generally true that school-universities projects last until the funding cycle ends, then quietly fade away. This pattern is caused by failure to institutionalize new roles and relationships. Can universities and school systems see their way clear to advance venture capital to support new staffing patterns which hold promise for better learning for pupils and better preparation for teachers?

Summary

The program of activities described in this report represents an emerging experience in collaboration. We have asked 19 social studies teachers to move beyond traditional teaching and explore an uncharted terrain: teaching strategies which may enhance the thinking processes of their students. This is the first step. We are asking some of these teachers to help us educate future teachers in behaviors that provide students with authentic encounters with subject matter. There is nothing mysterious about the meaning of authentic encounters. These are encounters in which the students have some honest intellectual work to do with the content; honest because it emanates from students' questions, intellectual because it entails tapping deeper levels of the information structures which help explain, provide connectedness, and develop meanings from given events.

Our collaboration should continue to result in considerable staff development for the school system and in new patterns of teacher preparation for the University. On campus, we need to do our share of crafting authentic as opposed to rote learning experiences. We need to make fuller use of our colleagues who do history, psychology and philosophy because they love it. Sessions we have organized that have brought together colleagues from history and psychology with Twin Lakes teachers have suggested that these bridges may simply be waiting to be built. When our students are ready to venture into their initial teaching, they should find role models which reinforce their campus experiences. They should also find a university presence, offering support and encouragement and a link back to the resources of the campus. A Twin Lakes teacher noted that he often gets requests for money from the alumni association of his university. Why, he wondered, does he never get a note that says "We're doing something interesting in American History. Come on down and have a look?" Most importantly, they should perceive an enterprise marked by reflective examination of what it means to be getting, or giving, an education.

No delusions of grandeur should be held about collaborations. They do not come into existence when the superintendent and the dean sign an agreement. They are negotiated inch by inch, minute by minute, person by person. Collaborations are marked by stresses and strains, intrusions and resistances, pleasures and pain, and successes and failures.

These are not simply physical, structural, or managerial characteristics of interacting institutions. They are also, perhaps even mostly, the values, attitudes, beliefs, expectations, and emotions of the teachers, coordinators, principals, superintendents and professors who are doing the collaborating. These highly personal dimensions interfere with digestion, mobilize aggressions, disturb sleep and, occasionally, bring a shining moment. Hopefully, slowly, over time, consensus emerges on important issues.

It would be easy to give up our pursuit of true collaboration, because the difficulties are many. We are encouraged by those who understand the importance of the battle and make us believe that it may all be worthwhile in the end. Judge (1987) observed of the Holmes Group report:

> One of the greatest of the many virtues of the report is its insistence on the concept of professional-development centers. Integral to this insistence is the recognition of the indispensable contribution to be made to teacher education by the more able practicing teachers and of the importance of the proper articulation of clinical experience with graduate study at the university . . . . The professional development centers are important in other ways as well, and not least as sites on which it will be possible to develop and analyze new patterns of schooling and teaching. (Judge, 1987, p 19)

While we cannot say at present what the professional development site and the call for moving the study of professional education to the graduate level may one day mean for us, we believe that Judge has in other ways touched on the heart of the matter. These are the twin stars by which we chart our course: the indispensable contribution of teachers to teacher education and the possibilities for analyzing new patterns of teaching and schooling.

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Part II

Program Assessment Report

The Development of Collaborative Teacher Training

The Development of Collaborative Teacher Training: Twin Lakes / Purdue Enhancing Thinking Skills Program Assessment Report

The current movement toward the establishment of collaborative relationships between school districts and universities in the preparation of teachers holds much potential to re-vitalize the process of teacher training. Heightened exposure of education students to practicing teachers can create a more complete and immediate experience than can be offered through university-based methods courses alone. The goal of collaborations, however, is the joint forging and testing of concepts and beliefs that define "better education."

The Twin Lakes / Purdue Enhancing Thinking Skills project has a dual purpose: to develop a partnership in which school teachers and administrators can join professors in the education of teachers, and to explore models of teaching which enhance thinking skills in students. We believe that college students gain significantly from experiences in schools that extend, reinforce, and build upon the concepts introduced in their college courses. We believe that concepts which acquire meaning through practical applications are more likely to be available to college students when they begin their own teaching. This report will focus on the dual purposes of the project. We will detail the process of establishing the partnership in teacher training between Twin Lakes School Corporation and Purdue University, and we will examine the development and application of the

instructional model which has driven the classroom experiences which the Purdue students have had at Twin Lakes.

Competencies and Belief Systems of Teaching

The collaborative relationship in teacher education which we have been developing attempts to confront directly the question of "What teaching is of most value?" We did not choose to establish a program which would simply do a stronger job of socializing young teachers into business as usual. Rather, our objective was to strengthen teaching designed to enhance the development of critical thinking skills. This emphasis on critical thinking skills reflects a growing interest on a national level to develop student skills for dealing with school content in a more thoughtful, reflective manner.

We worked with an inquiry-based instructional model (described later in this paper). We believe that in order to acquire competence in this mode of teaching, college students must have both a theoretical background and opportunities to develop and present lessons oriented to thinking skills. Accordingly, we have worked intensively with administrators and 19 social studies teachers in a single district to strengthen their skills in teaching behaviors oriented to the instructional model, so that they might more effectively serve as models for pre-service students and student teachers.

We developed three sets of activities through which to accomplish the dual goals of the project--exploring the implications of teaching oriented to thinking skills; and forming a partnership among teachers, administrators, and professors

jointly to offer pre-service experiences to college students. In the first set of activities, the principals and teachers of each school in the district developed "school plans," which spelled out how each faculty would systematically explore in their classes the implications of teaching based on principles of inquiry. These plans were developed jointly by the principal and social studies teachers in each school, and carried out under their own discretion. University staff visited with the principals and teachers of each school at the end of each grading period to provide encouragement and support, and were available for consultation and feedback upon request.

The extent of planning in the school plans varied from school to school. As a rule, the planning was more extensive and the interaction of administrator and teacher in exploring the instructional model was more extended at the lower grades, less so at the higher. At a minimum, each social studies teacher taught four lessons utilizing the instructional model. The principal joined in the process of lesson planning, observing, and de-briefing. In some schools the format was extensively thought out: pre-observation conferences were held in which principal and teacher jointly planned the thinking skills lesson; the principal observed the lesson and in some cases participated in it; and post-observation conferences were held in which the lesson was critiqued and the lessons learned applied toward future lessons.

In the second set of activities we began a process of refining the student teaching format in order to feature

experiences in inquiry-based teaching. The superintendent in consultation with project staff initiated a draft of a proposed agreement delineating the student teaching experience. This draft was revised in meetings at the university among student teaching supervisors, at the school system among cooperating teachers, and in meetings which both groups attended. The document contains nothing startling, excepts perhaps that it does specify that student teachers have experiences with instructional strategies targeted at critical thinking, but it represents a student teaching format that was jointly developed by the university and a school system, instead of one imposed on the school system by the university.

Our third set of activities focused around the development of teams of teachers and professors who jointly taught ED 406, the secondary Social Studies methods course, on campus, and on site in the school system. This will be elaborated later in the paper.

This project led the social studies teachers of an entire school system to confront their instructional assumptions and strategies. As this process proceeded, several issues emerged. At the most primary level were the stresses and strains of dealing with basic issues of beliefs about what is to be learned and what is meant by good teaching. The model is not trivial. It represents a radical departure from the textbook-bound, content-memorizing teaching which characterizes many social studies classes. For all Twin Lakes teachers, even those already inclined to inquiry principles, learning to build lessons which

smoothly incorporated all the components of the instructional model was a difficult process, which stretched over all three years of the project. One Twin Lakes teacher, reflecting in May, 1988 over the struggle to master the model, pointed out that the methods class students had repeated their early errors:

> You know how we struggled because we started out with the big unit and the big idea and it was just too damn big! And we made the same errors again with this group (the methods students) because when we talked to them, they were still thinking they should be thinking about the unit, and they really need to start with the miniscule, one single point if possible. Get that single idea confrontation, so that when they're through they can see I got that to work.

This understanding of the model came over time, however. In the first two years of the project the teachers taught "demonstration lessons," reflecting the instructional model, as distinct entities; the integration into daily teaching came in the third year for those teachers who were put into a position of having to teach it to the methods classes. For some teachers, frankly, it has not yet come as well as we would like.

One sixth grade social studies teacher enumerated the problems inherent for teachers in working in such a project. "Only certain teachers are willing to put in the time it takes to develop thinking skills lessons, and it does take time to prepare materials and activities. Teachers who already relied on questioning strategies in their teaching acquired inquiry

techniques more easily than did more traditional teachers." Teachers were not allowed to opt out of the project, and some resented what they saw as being forced to work with a teaching strategy that they did not find congenial. Logistical problems arose when teachers felt inundated by Purdue student observers, or when they felt constrained to interrupt their schedules to teach a thinking skills lesson at the time when the college students would be coming up.

Students in the Social Studies Methods course, ED 406, also wrestled with the difficulties of the instructional model. One Purdue student complained that she thought she was going to learn to do "real" teaching (by which she meant lecture) in her methods course. Twin Lakes teachers picked up from the Purdue students they worked with that the students were going along with the thrust of the course, but did not believe it was really relevant to them. Most of the interaction that Purdue students had with Twin Lakes teachers came at Roosevelt Middle School. Several of the Purdue students indicated that they thought the focus on materials and realia in the classroom was all right for younger students, but they planned to teach secondary, where they will lecture.

Fortunately, most of these problems vanished over the spring of 1987 when the methods class was taught on site in Twin Lakes. The bulk of this experience was carried out at the middle school. That is where many of the teachers were who were most expert in the instructional model. Moreover, all of the high school teachers (the methods class was secondary methods) were either

coaches or had other after-school duties, limiting the time they could make available for working with the methods students. Students in working with the younger children began to see the power of lessons which engaged student thinking, and the importance, as methods student A. put it, of "seeing how they grow all the way through the process." Methods student B.: "I don't want my children to come out of the classroom thinking they know all there is to know about the Civil Rights Movement. I want them to be thinking about what does it mean to say someone's equal, and there are a thousand other issues. I think it should just be like an igniting spark so that it will transfer, the behavior will transfer past the boundaries of the classroom." Methods student C.: "I don't think that anybody really hit the idea that these kids are growing up. They've got that to deal with. A lot of times that just comes before school. If you can tie the school in with them growing up, which is showing them this is what's out there, you could grow towards something."

The frustration the methods class students felt with inquiry highlighted the issue of competencies and belief systems. Whether by nature or through the influence of their workplace and culture, teachers often are very conservative, as a group. The emphasis is often on pupil control--students busy and in their seats. Even innovative teachers may feel this at times, from the press of the number of students and the limited instructional time which they have available to them. The emphasis of our own pre-service students was similarly conservative. Their main concern in the methods course seemed to be grades and doing what

they perceived the professor wanted. In the spring methods class the students were placed in groups, and each group was paired with a Twin Lakes teacher, with whom they were to build a thinking skills lesson based on content still to be covered in that teacher's class that year. Many felt frustrated because building the curriculum units was a task they believed at first to be beyond them. One cooperating teacher felt that in some respects sixth grade students are more flexible than college students. College students were perhaps looking for prescriptions much in the same way classroom teachers often do, causing them to get frustrated with the emphasis on thinking skills. Their newly developed curriculum units were often at first only general models, because early in the semester they conceptualized the purpose of the assignment as being to satisfy the professor and get a grade, not to think through options in terms of how to teach students. This raises a potent issue for teacher education. How are particular types of the conservative belief systems of college students to be opened up at the university, and how will parallel norms of experimentation and flexibility be encouraged among teachers and others in schools? Unless both settings not only support but encourage and reward this type of initiative, the likelihood of much change is small. The problem is to find method and means to bring together that handful of people at the university and school district who are ready to engage these issues.

Comments that the methods class students brought back from fall semester observing and working with teachers are

particularly instructive for the light they shed on the conflicts and turmoil existing in the district at that time, as teachers and college students confronted the issue of opening up teaching strategies to include an emphasis on thinking skills. Depending on the particular teacher a student observed, considerable dissonance could develop over what the professor was telling them in class and what they found in the district. A student reported that Twin Lakes teachers told him that the instructional model is one of many tools, appropriate at some times, not others; in any event not an approach around which they would build a semester's work. Several teachers commented that this sort of thing was all right for professors, who did not have to handle the course loads and rowdy students found in the schools. A methods student sensed that many teachers felt they lacked a sufficient reservoir of knowledge to handle open-ended investigations. Still others complained about the difficulty of assembling resources for a mode of teaching which calls for student engagement in numerous independent investigations. The issue of evaluation of students and of the teachers themselves was problematic: teachers made comments related to their perceptions that, "the principal or a parent wants 30 grades in my gradebook," or fears that following the approach would mean that, "I would have a blank section in my gradebook." Others complained about the personal cost: "This takes too much time. I'm being asked to re-vamp my whole system, and I'm not getting paid a dime for it." Other teachers remarked on the gaps in coverage which could emerge from in-depth study of a given topic: "What if a student spent a lot of time early on on

a given subject and couldn't finish the text? He would get to the next text with gaps."

As the partnership goes forward, we realize that we need to look more closely at the question of working on teaching strategies which help reduce the disparities between classroom practices and the model. Those comments we have received--on the amount of preparation time, on the difficulty of getting together sufficient and responsive resources, on the management problems of opening up unstructured situations, on problems with grading non-traditional student products, on managing simultaneous multiple student investigations, on acquiring competence with questioning strategies, on the unpredictable and changeable nature of student responses to lessons and activities--were not necessarily attempts on the part of teachers to avoid or side-step the model. For many, they were signs that the teachers were beginning to take the model seriously, which for a teacher means, "O.K., so this might be good for my students. Now how do I make this work in my classroom so that I can manage it and bring it off successfully?"

Indeed, the press of the teacher's day militates against instructional models which focus on the interaction of the individual child with the ideas that underlie content. A Twin Lakes teacher noted: "We've got spelling and math and English and reading and when the homework assignment goes home there better be an assignment in each area or 'Why are you not teaching English today?' You know. And the math book--we wanna get through every page of the math book because if we don't then we

don't do well on the achievement tests. Ok? It's a real situation."

At a planning session in December of 1987, involving Twin Lakes administrators, teachers, and Purdue staff, a veteran teacher asked, "What would you do with 30 kids thinking?" After much laughter, it was agreed that this was the seminal question for the entire project. The idea that all the students in the room could be caught up and engaged with the lesson to the point that they were actually doing critical thinking was so foreign to the normal reality of the classroom that it struck everyone as funny; but this is precisely the goal toward which the project strives. It does, however, explain some of the dissonance the methods students were feeling in their interaction with Twin Lakes teachers and classes. If this question daunts a veteran teacher who had been wrestling with it for almost three years, it is particularly problematic for preservice college students.

Teaming the methods students with Twin Lakes teachers in developing materials for inquiry lessons has become a powerful vehicle through which to address some of these concerns. The benefits of involving Twin Lakes teachers in the methods class are that Purdue students get to work with a real teacher from an actual school system (who thereby comes into the setting with great credibility) in their methods class and explore ideas and see instructional activities that the practicing teacher feels work and do not work in the classroom. This allows the teacher as well as the students to confront belief systems about the nature of desirable educational experiences. It also allows the

teacher to consider the problems of teacher preparation and explore the emerging role in teacher training for the field-based practitioner. Further, school administrators--particularly principals--have been called upon to demonstrate leadership and take a part in educational renewal and the planning and delivery of pre-service experiences for college students. We believe that heightened exposure to practicing teachers and their schools makes theory come alive. Instead of simple observation, for example, our students have the opportunity to form relationships with teachers, work with them in the preparation of materials, and explore how they think and how they approach their craft. This arrangement also provides an impetus for supervising teachers to explore and refine the craft which they will be sharing with their young colleagues.

A Delivery System for Collaborative Teacher Training

Engagement with the project and the subsequent work on the student teaching format had the effect of changing the expectations for the student teaching supervising teacher. Since the agreement spells out expectations for all participants in the experience--the student teacher, the supervising teacher, building principal, central office administration, and university supervisor--all of these groups have had opportunities to review the draft and make suggestions for revisions. Teachers hosting social studies student teachers have begun a series of meetings with Purdue project personnel, the on-site coordinator, and Twin Lakes administrators, developing specific strategies to deliver appropriate experiences for Purdue student teachers. The first

strategies work session set forth expectations for everyone involved. The ideas and problems identified became a sort of needs assessment of work left to be done, and consequently an agenda for planning further sessions. These strategies and the actual format of the program are viewed as being in a state of perpetual revision, to be continually improved and refined with the passage of time. The Twin Lakes administration takes the revised format seriously enough that the superintendent will not approve the placement of any student teacher in Twin Lakes (no matter from which university he or she comes) unless that student and the university supervisor agree to let the student teaching experience be guided by the document. The experience has offered an opportunity for public school and university staff jointly to plan and carry out revisions to the student teaching experience in a way that has never happened before. While planning and development are proceeding collaboratively, this experience is significant in that for the first time a major change in Purdue's teacher preparation program was initiated by field-based colleagues--marking a new equality in the relationship of the partners in teacher preparation.

Student teaching logs and lesson planning sheets collected from three of the students who were placed in Twin Lakes reveal that the students made considerable progress in applying the instructional model to their teaching. The two strongest aspects of the model for these students were planning the initial confrontation and developing transitional queries. None of the three were as successful as we may have liked in managing student

investigations into their own questions, although all made efforts to carry the model through completely.

Selected quotations from their logs demonstrate the concepts with which the students were engaging.

> Student teacher A.: We discussed the New Deal and its implications on American domestic policies. The "New Deal" is a topic that can provide an excellent "confrontational experience." On the one hand, most will believe the government should provide some kind of financial aid to those who are in need. On the other hand, others will argue with equal fervor that government intervention, especially at the federal level, is nothing short of 'creeping socialism." I hope to be able to "set the stage," especially through the use of questioning strategies, for a confrontation based on these simultaneous but conflicting beliefs. It is my belief that most, if not all, of these students harbor these conflicting beliefs.
>
> Continued our discussion today of the First New Deal. As I expected, a lot of the students volunteered opinions on the role of the government in intervening in the lives of Americans facing severe economic woes. Some students expressed the opinion that the government should have a large role in helping the economically stricken. On the other hand, a few argued that such help would drain the American economy, put the U.S. in debt, and hurt everyone in the long run. To my

pleasure, some students were agitated and, consequently, had identified a "problem" of their own.

Student teacher B.: In general, both classes had difficulty understanding that the depression was more than the stock market crash. They fail to see that history involves the combining of information; events cause a reaction which in turn causes another reaction the dominoes effect. If students can see how events are intertwined, then they will be able to identify trends better. Hopefully, tomorrow's critical thinking exercise will help them see that the Depression was a chain reaction that was caused by several factors.

Periods 3 & 4 continued to meet in groups and discuss the different points of view. After sitting in on groups and continually explaining what they were to do and how to go about it, I concluded that the exercise may be too deep for them to understand. Some groups did realize that history was a combination of events and were able to come up with good answers. However, most of the groups would not put enough effort into thinking or caring about the causes of the Depression. I took period 7 for the first time today. I expected it to be difficult to teach the last period of the day, especially on a Friday. As it turned out it was the best class of the day. Instead of breaking them up into groups I used the CT [critical thinking] exercise as a class discussion tool. I introduced each

view, gave an example and let them develop it and feed me back new information/examples. I found this to be more productive and less time consuming. This might be a better way to handle difficult concepts.

While much work remains to be done in learning how to guide the student teaching experience so that it develops teaching competencies which reflect research-based instructional models, we believe that the student teaching format and process we are using represent a place to begin.

What we are learning is that adequate time for long-range grassroots development is a necessity if a long-term relationship is to be established. For example, in the development of the methods class, we decided that observations should emerge naturally, led by the teachers who were planning the experience. We had the experience in the fall semester of 1987 that methods students were being scheduled to Twin Lakes in numbers and in a frequency that teachers could not handle. A Twin Lakes teacher: "I know that I was really frustrated when some students showed up early, like an hour early. And then, with just your everyday stress, I said, I've had it. No more observations. There were five and six a day coming in."

During the spring semester, we came to a better understanding of what we could accomplish through observations. For example, at two of the elementary schools we had teachers new to the system, who lacked experience with the project. In April we arranged for these teachers to accompany Purdue students in their observation of teachers who were experienced with the

instructional model. This was an example of one of the most valuable effects of the project: peer interaction in which teachers opened their classrooms to their teaching and preservice college student colleagues.

We have held as a tenet of the project that no teachers were allowed to opt out. Teachers would engage at a level where they felt comfortable and would contribute as they felt able. All teachers were asked to confront the implications of thinking skills models for their own teaching. As time went on some teachers indicated interest in going beyond the focus on their own teaching and in exploring the new role of teacher trainer. This development is most evident with the teachers who have elected to work with the methods students. As these teachers become more deeply involved in the planning and conduct of the course, we need to find more satisfactory ways of obtaining released time to facilitate teacher involvement with Purdue students. Indeed, released time quickly becomes problematic for the pupils when the teacher is gone too often, no matter how worthy the reason. We are pursuing the possibility of external funding to hire a full time teacher(s) who could free up selected Twin Lakes teachers for a half day to work intensely with other Twin Lakes teachers and with Purdue students, on campus and in the school district.

There are then numerous issues still being defined. These include the new role of "practitioners" in the field of teacher education, and the availability of time and other resources which can make this involvement possible. Further, we are exploring

the question of how public school/university collaboration should be formally structured. What official standing in our university can and should the teachers have who are helping design and teach the methods class? A related cluster of issues concerns the school curricular plans and teaching strategies oriented to thinking processes. Will it be appropriate and feasible to continue this emphasis, to extend it to other subject domains?

From the standpoint of developing the partnership between the two institutions we are looking at issues related to the realities and interpretation of the cultures of the school and the university. These include the needs each has in teaching and in gathering and utilizing data. Another issue addresses the traditional ways in which time is to be used, which often seems to be structured by the professor or administrator, but for the teacher. We are concerned with the perceived dichotomy between the "practical" and the "theoretical," and teacher incentives for becoming involved in curriculum development. Finally we are looking at financial and physical resources that each institution can provide, support and coordination mechanisms for collaborative efforts, and questions of building mutually supportive research cultures in the university and the schools.

The university must face the issue of the scale of this project against the number of students that need to be served. Realistically, Twin Lakes cannot be the only site where Purdue explores ways of linking theory with practice. Each year there will be hundreds of methods students and student teachers seeking field experiences in settings where there is consistency between

the conceptions of education held by the university and the schools. The Twin Lakes-Purdue collaboration can, however, be a place for exploration and development of the principles that can then serve as a model to guide engagement with other school districts. The tensions and differences between the university and the school district over the pre-service experiences of college students have historically been ignored or glossed over (and in most instances still are). We seek a relationship in which our conflicts and differences can be openly examined and hopefully resolved, to the improvement of the programs of both institutions.

Issues in University/School District Collaboration

The Role of the Principal

Research evidence (Huberman & Miles, 1984; Katz & Kahn, 1975; Lippitt, Edmundson, Cowing, & Lippitt, 1975; & McLaughlin & Marsh, 1978) and our own experiences strongly suggest that a key role in advancing the collaborative program at the school level is played by the building principal. Principals in our project were involved in the school plans for exploring inquiry teaching and played a role in strengthening the student teaching format. Principals have joined with their teachers in planning, observing, and critiquing thinking skills lessons and in reflecting on the implications of this way of teaching. In their lesson debriefing at one school, the principal and teachers concluded that it would be advisable to let the students do idea posting before they go into group work; otherwise, the first idea to come up dominated the group's thinking. At another school,

the principal noticed that a lesson was failing because when the students were called upon to summarize, they simply made lists. Asked to use their summaries, they read the lists. Working together, the principal and the teacher were able to come up with some activities to teach the skill of summarizing so that it might be employed in the next thinking skills lesson.

It is nonetheless true that the role of change agent is a difficult one for most principals. Principals tend to react by taking care of the "flock"; teacher frustration with a change effort impacts on the principal. Consequently, administrators need support if they are to lead change processes. Many principals have never engaged teachers in an exploration of teaching strategies. For one thing, the press of administrative duties gets in the way; for another, the principal-teacher relationship has in it an evaluative function that sometimes hinders the development of a collegial spirit in examining issues of belief and technique. Consequently, when teachers struggle with an innovation, the principal may know no other way to respond than to adopt a rigid stance enforcing the activity, without being able to offer the empathy and encouragement which may be the teacher's greatest need in the early stages of an innovation.

In some instances in this project, the extended relationship required in the process of discussing the thinking skills lessons has broken down some of those barriers. At one school the principal was very aware of what his teachers were doing on the thinking skills lessons. He had observed all of them, and had

come to a new understanding of his teachers. He could describe and categorize their teaching styles and point to specific gains they had made in the project. He could also describe shifts in his own perceptions of their teaching. For example, he commented that one of the teachers "runs a room with directed chaos--lots of things going on. I have come to see this as productive. He may have the answer to what one does with 30 kids thinking." This principal's frequent interaction with the teachers, occasioned by the thinking skills lessons, culminated in his active engagement in a class contributing to the lesson, an activity not done previously.

Problems with Overload

In the fall semester, 1987, the observation by students in the methods class were done almost exclusively in one middle school (there are six project teachers there, as opposed to four at the high school and one to three at each of the elementary schools). The number of young people coming into classes and the frequency with which they came became unmanageable. The middle school teachers endured with good grace; but when we began to make plans for the Spring, 1988 methods class to be taught on site in Twin Lakes, the teachers had had enough. A meeting with teachers who were being invited to join the Purdue professor in team teaching the course ended inconclusively, with teachers willing to be resource people in the course, but not wishing to take on large responsibilities for teaching it. At a meeting several weeks later, teachers said no more observation, no video-taping, no responsibility for preparing methods class

presentations. As one eighth grade social studies teacher put it, "I want my class back."

Although this was a blow to the project staff and the university professor, we bowed to the teachers' wishes: "It's (bringing methods students to Twin Lakes for their class) a good idea, but its time hasn't come, and we won't bring them." The teachers later reported that this meeting was the turning point in the cooperative development of the field experience component of the methods course. To the teachers, this was the moment when the university stopped pressing and finally started listening. Planning was re-initiated, this time giving the teachers the major voice in the sorts of experiences they would like to see the methods students receive. A class format was developed that involved taking Twin Lakes teachers on campus part of the time, and bringing methods students on site in the school district at other times. Teachers teamed with squads of Purdue students to develop lessons and materials oriented to teaching content in ways which engaged thinking processes, and a very valuable experience took shape. The middle school teachers and others at Twin Lakes became committed to the project because they had more control over what would happen, were involved in the planning, and were engaged at their comfort level. In addition, it was apparent that the university was explicitly recognizing that they have practical skills and expertise to share with novice teachers.

Value of the Project for Teachers

The value to the teachers of participation this project has been personal as well as professional. An eighth grade teacher with many years of experience commented on his feelings about being invited to come to Purdue and present to the students in the Social Studies methods course:

> I thoroughly enjoyed the afternoon that I spent with the methods kids at Purdue. . . I found it very enlightening for me. . . I found it very elevating from a professional standpoint for me. Because for the first time in 30 years I was something other than an 8th grade junior high teacher talking to 8th grade students. Some other adult people had some interest in what I had to say. And were going to pay attention to it and I was going to have some kind of a mark on a later day teaching in the schools. That's a good feeling.

Collegial planning and sharing have also occurred in the district, as a consequence of the project. For instance, one day last Fall three teachers (new that year to the corporation and consequently new to the project) from one elementary school came over to the middle school to observe a veteran teacher, and work with him in planning their thinking skills lessons. While they were there, their classes were covered by the superintendent, the assistant superintendent, and the building principal. This joint planning across grade levels and indeed across schools is rare in school districts. Finally, the involvement of the principals in

the building plans brought principals and teachers together in developing, teaching, observing, and debriefing lessons in a cooperative, collegial mode that moved principals in the direction of becoming instructional leaders.

The Question of Motivation and the Status Quo

Committing the district to this project was an act of educational faith on the part of the superintendent, an act with potential benefits but also with potential problems. The district is a good one, with quality teachers and a sound educational program. Becoming involved in a project committed to enhancing thinking processes brought teachers and administrators into stressful, often unpleasant confrontations with long-standing values and beliefs about teaching and instructional strategies. The old truism that all teachers (and schools for that matter) can always be improved is a delicate matter when improvement efforts actually start. Had participation in the project been voluntary, some teachers would probably have chosen not to be involved.

These are important questions about how professional improvement is best initiated, and to what extent participation should be voluntary or mandatory. In this case, those teachers and principals who were already excellent have predictably continued to be so; but even those who were not so excellent and who might not have volunteered have extended their experiences and are changed in some ways. As a teacher noted, "Even the teachers who resist are at least thinking about teaching, so this (the project) has been a confrontation (a term from the

instructional model) for them." The superintendent made a decision that when there is a substantive innovation, educators have an obligation to stay current. In every circumstance, there are occasions when administrative decisions have to be made quickly. In this project, for example, the decision to adjust the Purdue calendar to allow for the block of time necessary to bring the methods students to Twin Lakes had to be made far in advance of the semester in which the experience was to occur, consequently far in advance of any opportunity the teachers had to agree or disagree to the concept, much less participate in designing it. Similarly, it was the superintendent who set in motion the process of reviewing the student teacher format. While administrative decisions are necessary from time to time, the danger of "doing it to them" is always present. Advancing efficaciously, while at the same time keeping key players informed and in a position to provide the feedback and input without which initiatives are doomed to failure, is not a trivial action.

The project has not accomplished equal success with every social studies teacher in Twin Lakes. However, even those who resisted have made progress (A principal remarked about a teacher that "At least now the films in class relate more closely to the lesson content."), and those who chose to come on board have been given increasing input to the design of the emerging partnership in teacher preparation. For some, the experience has been very rewarding, indeed. A veteran teacher summed up the three years of the project this way:

> I made a commitment--I want school to be a better place when I leave than when I got here. And I would like for (my school) to reflect some of my ideas and some of the things I did after I'm gone. I'm at a point in my career where I'm not going to be here that many more years. If I don't get involved with it, it's not going to happen. As you know, we've cussed and discussed the (instructional) model, and we kicked that all around the place. But, it's been an interesting experience. I'd probably go back and do it all over again.

A Sense of Professionalism

A final consideration of the establishment of this collaboration concerns the reward structures which are necessary if the partnership is to be institutionalized. Public schools do not have in place a satisfactory reward system for working beyond the call of duty. A mechanism has to be developed to honor exemplary teaching, and to give teachers roles which allow them to share their craft and to explore new aspects of teaching. Rewards for the teachers in the project are primarily intrinsic, such as an enhanced sense of professionalism in sharing their experience with students on campus. Joint planning time is also part of the reward structure. It is the strong opinion of the superintendent of Twin Lakes, that it must be possible for teachers who are involved in growth activities to be treated in a way comparable to professionals in other fields. For example, teachers, principals, coordinators, and the superintendent have

made presentations and appeared on panels in Chicago, Washington, San Diego, and New Orleans. Two teachers represent the system on a three-district committee working with thinking skills models for the State of Indiana. They report considerable satisfaction and professional stimulation from representing the school district at these meetings. We have heard similar reports of satisfaction and professional growth as teachers work with professors in creating a better set of pre-service experiences for teachers.

Enhancing Thinking Skills

Reconceptualizing Teaching

The theoretical model (McDaniel & Lohmann, 1987) on which much of our project is based suggests a parallel between the cognitions of scientists and those of the developing child or adult. Kuhn (1962) has argued that scientific advances come, not from slow, gradual accretion of knowledge, but from revolutionary breakthroughs which are made necessary by failure of existing theories to explain current observations. The new breakthroughs-"paradigm shifts"--function to restructure the field, to provide new ways of perceiving and interpreting phenomena.

In a similar fashion, Piaget (1970) has proposed that children's mental development is characterized by "equilibration", the changing of cognitive structures so that new experiences can be interpreted and fitted into the child's conceptions of how things are. This has led us, along with others, to define cognitive growth as "cognitive restructuring."

A case can be made that education is mostly a process of acquiring broad concepts which restructure the ways we perceive and interpret events. This restructuring means acquiring important concepts and paradigms from the specialized fields of study. Thus, our understanding that plants need sunlight to grow shifts to include chlorophyll and photosynthesis. Education helps students go beyond the immediately observable features of a situation and provides conceptual tools which help them interpret events in terms of causal relationships.

Unfortunately, some students never see that the content of a discipline includes tools for organizing and interpreting experience. Teachers who are providing content knowledge without also helping students see that the content provides new ways of organizing knowledge or interpreting events may inadvertently be hindering rather than helping children grow. Brickhouse (1988) describes an energetic teacher whose class, upon first look, might seem quite acceptable to students, parents, teachers and principals alike:

> My initial visits to Cathcart's (pseudonym) classroom were quite confusing. As an outsider, it appeared to me as though there was a secret code that everyone knew and understood but me. For example, if Cathcart began reading out names from a sheet of paper, the students immediately got out of their seats and into new ones. If he began reading out names from a stack of papers, the students got out of their seats and picked up their papers from him. When he said

"relocate," that meant to get out of your "assigned seat" and into a "work seat" with your lab partner. "Packets away" meant that worksheets were to be put in their proper slot in the cabinet and they were to move from their "work seats"into their "assigned seats" and remain there until the bell rang. "Uniform heading" meant that they were to put the their name, date, and class period at the top of the paper and that this paper would be turned in and graded. When students reached a certain point in their lab activity worksheets, they would obtain Cathcart's signature. When finished with an assignment, it was important that students put papers face-up in the basket on Cathcart's desk.

. . . There were many routines to learn and follow, but these routines created a very efficient classroom. Students were always busy. . . . (pp 168-169).

Through interviews, Brickhouse determined that Mr. Cathcart viewed the scientific method as a set of exact procedures. His instructions for science activities always spelled out step-by-step procedures for students to follow. In an early observation, Brickhouse had difficulty seeing where the lesson was going.

A recurring phrase throughout these lessons was "4 balancing 2." It was only from reading the text that I was able to discern that the lab activity was intended to demonstrate principles of work and levers. As was

typical of all pre-lab instruction, Cathcart's emphasis was procedural rather than conceptual.

> . . . Cathcart's students have a great deal of opportunity to learn how to follow directions. This is an important part of Cathcart's instruction concerning both science and discipline. The students' actions reflect compliance with the norms and expectations of the classroom. The questions they ask Cathcart are nearly always procedural in nature, i. e. "are we doing this step correctly?" Questions of a conceptual nature are rarely mentioned by any of the participants in the learning activity. During the ISCS activities, students are typically quite orderly and compliant. They follow the directions. Whether they understand the rationale behind the directions is debatable; from my own very brief conversations with a dozen students, I do not believe they do. Only once could a pair of students answer a question concerning why they were carrying out a certain procedure (173-175).

Cathcart read his own case study and expressed surprise and concern, particularly about his focus on facts rather than concepts. He did not dispute the accuracy of the description, in fact, likened it to a photograph, but wanted help and suggestions for ways to teach "four balancing two" conceptually. He wondered about appropriate objectives for seventh grade science students, alternative ways to motivate students, how to manage class discussion, how much to emphasize accuracy, what is a

conceptual question and how to evaluate students' conceptual learning (Brickhouse, 1988, pp. 223-224).

What can teachers like Cathcart do in pursuing their continuing questions about their own teaching? It seems to us that changes in teaching strategies are more likely to stem from a reconceptualization of teaching than from a series of hints and suggestions about handling separate elements of the instructional situation. One of the important assumptions we make is that content, at the time it is acquired, must be viewed by the student as important. That is, the content should be viewed by the learner as useful in helping him or her decide what to think or believe about a certain situation.

The Instructional Model

The instructional model used in this project operationalizes the viewpoint that subject matter content is the vehicle for learning, not the end product. The end product is the large concepts which help the learner think about situations, together with developing skills in attaining and using concepts.

We believe that the teacher's main task is to establish a situation in which the students can begin genuine information processing. Once information processing has begun, the teacher's task is to maintain momentum and direction by questioning and by providing reference materials and opportunities for students to test their emerging ideas. As students construct and validate their ideas, new concepts are attained which change their way of thinking about and interpreting events.

It is beyond the scope of this presentation to describe the detailed analysis and to cite the research findings supporting each of the concepts and propositions which comprise our model. Hopefully, it will be sufficient to point out that this is an extremely condensed presentation and that the terms of the model are chosen to facilitate quantification and testing. Thus, while the terms may appear somewhat like jargon, they facilitate talking about concepts in terms of degrees on a scale; in short, to treat the concepts as variables.

In working toward a model of instruction which might guide classroom teaching, we found it necessary first to construct a model which would describe learning in its most general form; that is, to describe learning in both school and non-school environments. The following concepts form the building blocks of this general model of learning.

1. Learning takes place in a context of purposeful activity. It is the purpose of the learner that starts the search for meaning and provides direction for the learner's activities (Jenkins, 1974). To talk about the degree of involvement of the learner in encounters with the environment, we speak of Centrality.

2. The learner is essentially attempting to reduce uncertainty, to gain orientation, to find out what leads to what. If there is no uncertainty, the learner can move directly toward the goal and there is no necessity for learning to take place en route (Berlyne, 1960, 1965; Festinger, 1957, 1964; Garner, 1962).

To describe the amount of uncertainty in a new situation, we speak of Ambiguity.

3. Learners may process information on a number of different levels ranging from simple perceptual matching and recognition to deeper levels of cognitive analysis (Craik & Lockhart, 1972). To describe the level of cognitive processing of new information, we speak of Depth of Processing.

4. An important behavior in learning is probing, through which the individual generates and processes information about the environment (Miller, Galanter, & Pribram, 1960; Smith & Smith, 1966). To recognize that such probes can originate from either shallow or deeper thought processes and test relatively superficial or fundamental aspects of the problem situation, we speak of Amplitude of Probing.

5. Concepts may be relatively narrow, or broad and inclusive (Kaplan, 1964). For example, chlorophyll describes the green coloring matter in plants while photosynthesis describes the whole processes of the generation of starches from carbon dioxide and water. To indicate the breadth of explanatory concepts acquired by the learner, we speak of Comprehensiveness of New Constructs.

6. Learning may be defined as cognitive restructuring as a consequence of acquiring concepts providing new ways of perceiving, reacting to, or thinking about events (Bruner, 1960; Piaget, 1970). To recognize that incorporating new concepts may mean giving up old perceptions, we speak of Reorganization of Cognitive Structures.

These six concepts are organized into a model for cognitive growth in an encounter between an individual and his environment (Figure 1).

Blalock (1969) defines a model as a set of concepts and causal propositions which can be stated in the form, "an increase in a will cause an increase in b." This form of statement not only makes clear the propositions of the model, it also facilitates the transition from verbal to mathematical models. If instruments can be developed to measure both "a" and "b" the network of causal propositions in the model can be studied through the powerful methodology of path analysis.

Figure 1 is a causal model as defined by Blalock. It is not simply a flow chart. By assuming causal connections, testable propositions can be generated from the model. For example, the model specifies that when an individual encounters something in his environment which is central to his purposes and also ambiguous, he will start to think deeply about it. More technically, the model specifies that an increase in Centrality coupled with an increase in Ambiguity will cause an increase in Depth of Processing. Similarly, an increase in Depth of Processing will cause an increase in the Amplitude of Probing. This means that if the person thinks deeply (relates everything he knows to the situation), he will generate and test hypotheses that "get to the heart of the matter," i.e., he will test important relationships in the situation rather than superficial ones.

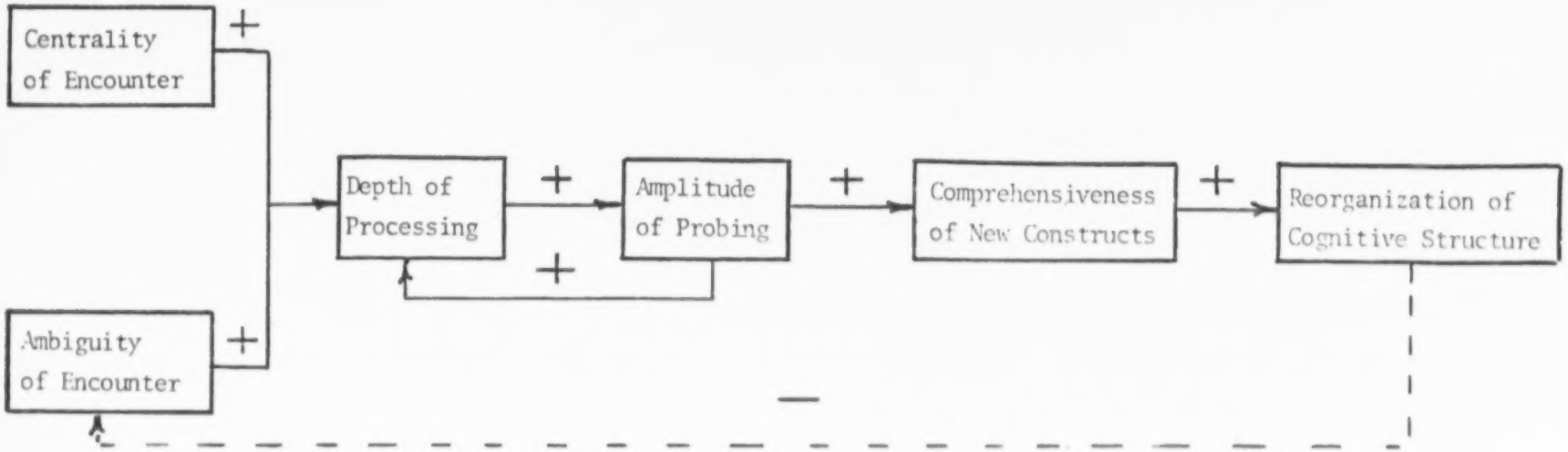

Figure 1. Model for cognitive growth in an encounter between an individual and his environment.

The next link in the model specifies that deeper probing will produce greater breadth in the concepts which the learner acquires. As broader concepts are attained, cognitive structures (belief systems) shift to accommodate the new concepts. The dotted line in Figure 1 leading back to the original situation is marked with a minus sign to convey the notion that the reorganization of the cognitive structures will reduce the ambiguity of the original puzzling event and make it more interpretable. Indeed, we would expect the learner to more readily interpret new events of the same class when they are encountered in the future.

Teaching Behaviors

What teaching behaviors can be identified that will assist students as they move through the various information processing activities specified in the model?

We propose that four teaching behaviors have a direct influence on the learner's perceptions and activities: Personalized Planning, Confrontational Emphasis, Transitional Querying, and providing Responsive Resources. Each of these teaching behaviors is defined below together with a brief description of behaviors that would characterize teachers as "low" or "high" with respect to each behavior.

Personalized Planning means selecting and organizing instructional activities that stem from concerns of the students and are in touch with students' goals, interests, and needs. In low personalized planning, the teacher arranges the instructional program independently of any knowledge about the students. In

high personalized planning, the teacher strives to know the students and to design classroom experiences specifically suited to those students.

Confrontational Emphasis means arranging experiences so that critical distinctions become explicit and compelling. With low confrontational emphasis, the teacher ignores discrepant features, offers simplistic solutions, avoids exploration of alternative methods or interpretations, and relies on authority, convention, or dogma to support a predetermined conclusion. With high confrontational emphasis, the teacher sharpens perception of distinctive features, recognizes complexity, encourages alternative approaches, and capitalizes on discrepant explanations, interpretations, or value judgments.

Transitional Querying means asking questions that help students make a transition from attending to superficial aspects of the problem situation to attending to more important aspects. It is the opposite of recitational querying which asks students to display what they already know. Transitional querying stimulates students to take the next step in reaching for relationships just beyond those already grasped. In low transitional querying, the teacher's questions ask students merely to report information, that is, to recite, recall, describe, list, or enumerate. In high transitional querying, the teacher's questions ask students to utilize information, that is, to compare, infer, extrapolate, hypothesize, or evaluate.

Responsiveness of Resources means the extent to which the arrangements provided by the teacher help the students test their

emerging ideas. These arrangements may be opportunities for experimentation, reflection, or discussion. They may include supplies, reference materials, or resource people who permit students to develop necessary information. With low responsiveness of resources, students do not have the opportunity for productive manipulation of objects and ideas. With high responsiveness of resources, students have the opportunity to confirm or reject their tentative ideas through testing.

These four teaching behaviors can be linked to the learning model to show how each teaching behavior facilitates a particular stage of the learning process. The result is a model for facilitating cognitive growth in a classroom environment (Figure 2).

The propositions about teaching behavior incorporated in this model are:

1. An increase in Personalized Planning will produce an increase in the Centrality of the instructional encounter.
2. An increase in Confrontational Emphasis will produce an increase in the Ambiguity contained in the instructional encounter.
3. An increase in Transitional Querying (in the presence of Probing) will produce an increase in Depth of Processing.
4. An increase in Responsiveness of Resources (in the presence of Processing) will produce an increase in Amplitude of Probing.

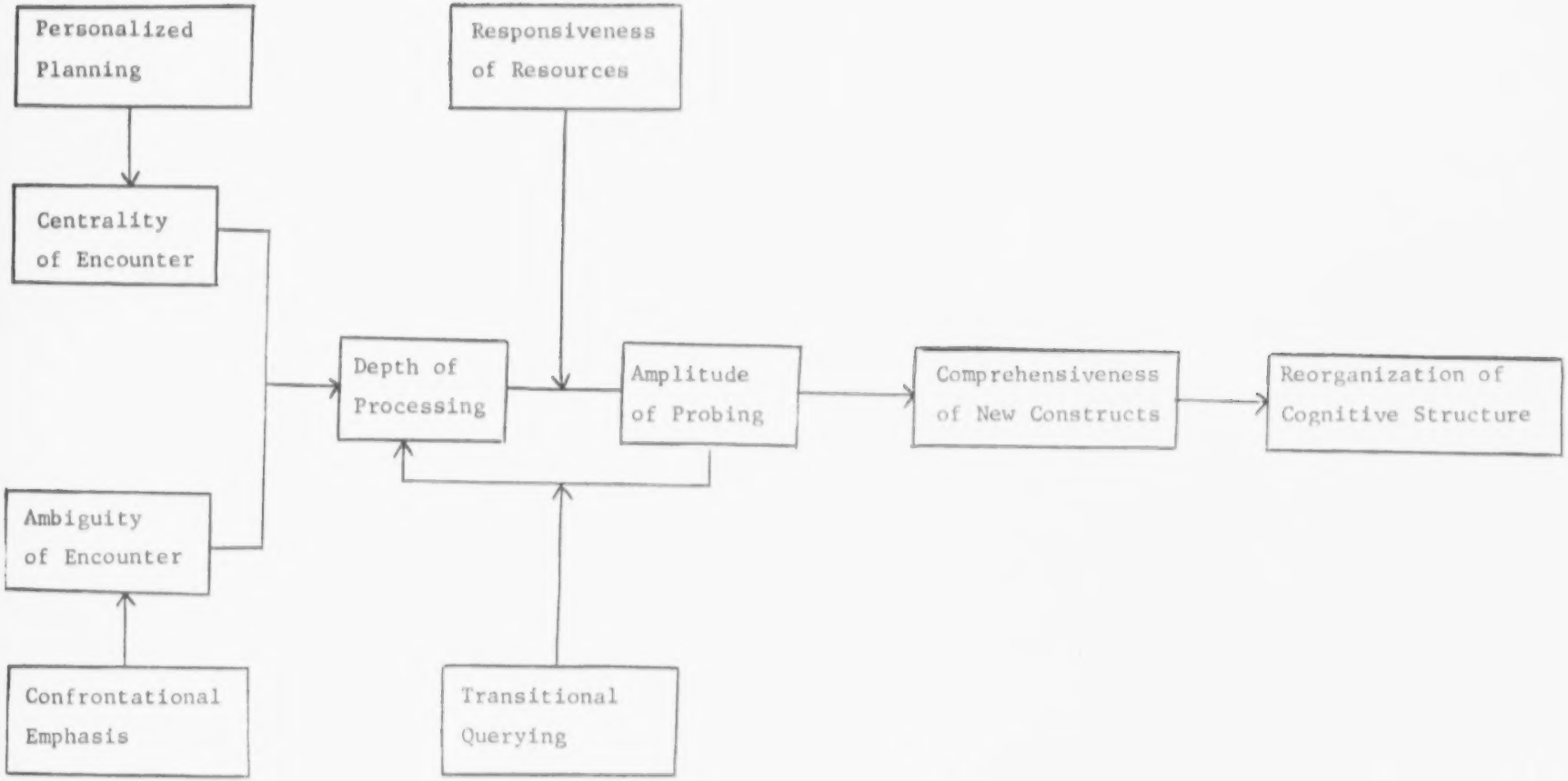

Figure 2. Model for facilitating cognitive growth in a classroom environment.

Hypothetical Classes Under Two Conditions of Planning

While the instructional model was developed as a way of making explicit and testable some assumptions about teaching and learning, it may also serve as an analytical tool in examining instructional plans and behaviors. As an exercise one may contrast a lesson or unit of study as it might be designed under two conditions, with reference to the model or without reference to the model. The following charts summarizes two possible approaches to teaching a lesson on the battle of Shiloh in an American history class:

Planning Without Reference to the Model

Opening: After teacher introduction pointing out importance of battle and main features, assign appropriate pages.

Development: Students read material and prepare for class discussion. Cooperative learning groups may or may not be formed.

Querying: Teacher asks questions to bring out main points and students respond from information covered: Who were the commanders on each side? How did this battle effect the disposition of federal forces in the west?

Resources: In addition to the text, wall posters, encyclopedias, feature articles of magazines and "picture histories" of the civil war are available in the room.

Following activities: Each student will further develop interests which have been generated during the lesson. This may include reports of civil war weapons, camp life of the civil war soldiers, role of women in the war, battle field medicine, etc.

Probable outcomes: Students will acquire knowledge of time frame in which battle was fought, extent of casualties, importance of battle in the future course of the war, description of person who later became President, and a belief that they can use information to develop and pursue their interests.

Planning With reference to the model:

Opening: After teacher introduction pointing out importance of battle and main features, two students role play the commanders of each army, giving conflicting accounts of the reasons for victory.

Development: Students discuss in small groups the discrepancies in the accounts and take stands on who might be right. Teacher posts on board conjectures and points of disagreement. Students look through materials in search of support for one position or another.

Querying: Teacher asks questions which serve as prompts for students to formulate problems, look deeper or consider other approaches: Where do these accounts seem to disagree? Would there be any reasons that would cause one to distort the facts? What kinds of

things should we consider in deciding which of two historical documents may be more accurate?

Resources: In addition to the text, biographies of civil war leaders, replicas of letters from soldiers who were at Shiloh and old newspaper accounts of the battle, and photo-copied chapters from Civil War books describing the battle of Shiloh are in the room.

Following activities: Each student will further develop the particular line of inquiry initiated during the class. This may involve more complete biographies of the leaders, examples of bias in eyewitness accounts, or the role of logistics in military operations.

Probable outcomes: Students will acquire knowledge of time frame in which battle was fought, importance of battle in the future course of the war, a view that the "facts of history" are really the "reconstructed facts" of history, knowledge of some criteria for evaluating the veracity of historical documents, and a belief that they are capable of organizing information to create and support a position.

We are not claiming that the model is an essential prerequisite for planning inquiry sequences. Many teachers who never heard of the model plan lessons which lead students to authentic engagement with school content. We do suggest that the model can be helpful to teachers who want to give students larger

opportunities to engage the subject matter in thoughtful and reflective ways.

All the social studies teachers in the project planned demonstration lessons using a planning sheet which was specially designed to elicit their proposals for accomplishing their personalized planning, confrontational emphases, transitional querying, and assembling responsive resources.

Testing the instructional model

Since one of the goals of the project was to test the propositions of the model, the third round of demonstration lessons of the second year was studied intensively. Using a specially designed observation scale (McDaniel, 1979) teachers were observed with regard to the four teaching behaviors specified in the model and numerical ratings assigned for Personalized Planning, Confrontational Emphasis, Transitional Querying and Responsive Resources. At the end of the demonstration lessons, students completed a brief questionnaire designed to measure each of the learner's perceptions and behaviors specified in the model (Table 1). Scores were obtained for Centrality of Encounter (Items 1-4), Ambiguity of Encounter (5-8), Depth of Processing (Items 9-12), Amplitude of Probing (13-16) and Comprehensiveness of New Constructs (17-20). A total score provided an overall index of the extent to which children responded to the lesson in a thoughtful and reflective way. At a later date, all children were administered parts of an achievement motivation questionnaire to determine to what extent their general approach to learning was motivated by satisfactions

Table 1

Student Questionnaire

Tell us how you felt about today's class

Yes Some No

Centrality

1. I found class interesting.
2. I liked taking part in this lesson.
3. I enjoyed the things we talked about.
4. How interested were you in today's class?

_____

_____

Ambiguity

5. The ideas we talked about did not always agree.
6. At first I was not sure what the answers might be.
7. At times I was puzzled about how everything fit together.
8. What were you trying to understand in class today?

_____

_____

Depth of Processing.

9. I tried to put ideas together so they would make sense.
10. I searched my mind before deciding what I thought.
11. I thought up new ideas.
12. An idea I came up with was

_____

_____

Amplitude of Probing

13. I made some guesses, even if I didn't say them aloud.
14. I felt like I wanted to get more information.
15. I wanted to check out some of my ideas to see if they were right.
16. One of the ideas I wanted to check out was

_____

_____

Comprehensiveness of New Concepts

17. I learned something important.
18. I now think about this topic differently.
19. I got hold of an idea that helped explain things.
20. Today I would say, I learned that

_____

_____

_____

Note: Boldface headings omitted from student questionnaire.

associated with understanding content and solving problems (Nicholls, in press).

Analysis of the questionnaire data was employed to determine the effects of teaching strategies on learning behaviors. Did students taught by teachers whose behaviors were consistent with the model respond more favorably than students taught by teachers whose behaviors were not particularly consistent with the model? Did the student's achievement motivation interact with the teaching strategies?

Because of the large differences in the organization and activities of elementary versus secondary classes, the data were analyzed separately for these two groups. Seven teachers and 112 students represented the fifth grade, while eight teachers and 137 students were in the middle school (grades 6, 7, and 8). Within each level (elementary or secondary), teachers were divided at the median into two groups--"high inquiry" teachers and "low inquiry" teachers--based on the observations of the demonstration lesson. Children were divided into two groups: "high" need to seek understanding and "low" need to seek understanding. The means for these groups are presented in Table 2.

For three out of the four comparisons, the means in thinking processes reported by the students were significantly different for lessons taught by "high" inquiry teachers compared to "low" inquiry teachers. There was no significant difference between "high" and "low" teachers in the thinking reported by middle school students with high needs to seek understanding. This

Table 2

Mean Scores on Thinking Processes Questionnaire

Need to understand	Inquiry teaching strategy: Low	High	
Grade 5			
Low	39.8	44.3	**
High	42,2	45.8	*
Middle School			
Low	35.7	39.0	*
High	41.1	42.9	

Note: Minimum score = 20, maximum = 60.

** sig. .01

* sig. .05

suggests that as students get older, internalized needs to seek understanding in school work may outweigh teaching strategies in influencing the amount of thinking they do in class. An expanded treatment of this analysis is presented in a paper by McDaniel & Armstrong (1988).

On the whole, the results of this study are very encouraging. They suggest that when teachers design and teach lessons guided by the instructional model, students in these classes report more thinking processes than students in classes where the model was less influential in the lesson design.

Case studies of two classes

The teacher observation scales and the student questionnaires can not convey the rich instructional interactions which took place in the demonstration lessons. In the following pages, we describe two middle school classes which illustrate attempts to teach lessons guided by the model. We also observed five randomly selected students during the lesson and interviewed them the following week. The interview schedule (Appendix A) was designed to reveal responses relevant to each component of the model. Did the students perceive the lesson as central to their purposes, sense ambiguity, think deeply, probe the situation, enlarge their ideas through additional material, or acquire broad, new concepts?

Teacher A.

Ms. A.'s lesson was based on an article students had been assigned to read in the Junior Scholastic magazine, "Can the U.S. survive? Your future is at stake." In previous meetings, the

class had been studying the various regions of Canada. To involve the students in the study, the teacher had introduced a mythical conglomerate, Apex Industries, with many branches. Students had been trying to persuade a branch of the company to relocate in their particular district of Canada by pointing out such advantages as natural resources, transportation, markets, and so forth. The teacher opened today's class by reviewing factors which students felt would be important to Apex Industries in considering a relocation. Student responses were posted on the board. Following this activity, Ms. A. made the bridge to the plight of the U.S. concerning trade with the Japanese.

Another list was made on the board of problems that could plague a company. The teacher allowed the students to generate ideas to complete this agenda. Talk at one point centered on "what we want in a product today." Some students related personal incidents to this point.

The teacher listed U.S./Japanese imports and exports from an article in Time magazine. Discussion ensued around the trade issue between the U.S. and Japan. Ambiguities and perplexity seemed to be generated, but students did not always have opportunity to voice their questions or thoughts.

The questioning at some points was largely recitational and informational in nature. As the lesson progressed and students started to sense ambiguity, their responses indicated a higher level of thought. The teacher asked students to group similar things, and to point out differences. At certain points she encouraged the students to relate points to each other and to

seek cause and effect relationships; i.e., "If our number one export to Japan is food and they retaliate by putting higher tariffs on our things, who gets hurt?" Another query which created a lot of student response was, "How can a company reduce the cost of a product?"

Many times the students had hands waving in the air to give responses, and Ms. A. could not call on all of them. It would be interesting to know how many additional student-generated ideas might have materialized had those students been able to have their say.

At certain points in the lesson the students were going beyond the data given, drawing inferences, and elaborating on additional implications. Several students even brought into the discussion the different values American and Japanese citizens place on education (as a consideration of why the Japanese are somewhat better prepared than we are in the trade markets).

Ms. A. appeared to know the interests of her students and to have considered them when planning this lesson. She did link with past lessons and built on those thought processes students might have carried over from them. The teacher guided the lesson in the direction planned, and some individual concerns were dealt with as a part of this lesson. It did not appear that there would be a lot of further investigation into student interest areas. Ms. A. did, however, make available some magazines for anyone who might have an interest in looking into related topics in more depth. It is uncertain whether any students took advantage of this.

The teacher and the Junior Scholastic served as the main resources in this lesson. The Apex Industries unit was also referred to. As stated above, some magazines were made available for interested students.

The observer recorded on a scale of 1 to 6 (McDaniel, 1979) the teacher's level of emphasis on each component of the model.

Personalized Planning	2
Confrontational Emphasis	3
Responsiveness of Resources	3
Transitional Querying	3

Perhaps most students would judge the lesson as rather remote from their own purposes, and would perceive only a moderate degree of uncertainty or ambiguity to be resolved. Responsiveness of resources and transitional querying may be somewhat generous estimates reflecting a desire to provide positive feedback to a teacher who had obviously invested a lot of effort in preparing the lesson. The extent to which students felt compelled to work on the ambiguity would vary with their involvement and engagement with the material. The independent notes of the observer watching student behavior are shown below:

> Ms. A.'s class worked on the topic of keeping America competitive with Japan in the world economy. The teaching pattern was primarily lecture, punctuated with questions leading to short answers. The most remarkable aspect of this class was the number of hands that were raised and held up while Ms. A. continued with her presentation. The interludes of discussion

seemed designed to maintain student involvement, but then the teacher also had organized material to present, material which could not be presented if the class became a continuous discussion group. Given that it was impossible for the teacher to respond to such widespread requests to participate, it is difficult to know what the raised hands of the five students I was observing really meant in terms of their involvement with the subject matter and their processing of the information. It is difficult to estimate the centrality and ambiguity of the instructional encounter for the student unless we hear the student responding in class.

Student 1. T. - While the teacher delivers a mini-lecture on the factors that contribute to the cost of a product, T. doodles. The lecture-discussion continues, but T. is not looking at the teacher. Later, there is still no observable evidence that she is attending. She may be looking at a Junior Scholastic (there are some on the desks of the other students), but she is too far away for me to confirm this. She stretches and yawns and later smiles at the comment of one of the students. The teacher catches both of us by surprise by asking her a direct question: "T., you have been quiet all morning, what are you going to do about it (making us more competitive with Japan)?" T. stumbles through a response.

During the interview one week later, T. was asked the standard question: "Some kids say that what they learn in school is not very useful. What did you think about this lesson?" She responded: "Pretty important to learn about how the U. S. competes with other countries. It's important for after college and out in the business world."

To check the ambiguity or uncertainty with which T. might have been grappling, she was asked: "While you were studying this, what were you trying to figure out?" Her response: "Why Japan is trying to compete with us. Why don't they keep their stuff in their country?" Asked to summarize what she got out of the lesson, T. responded: "How we're competing to stay in business. How important it will be after college . . . all the business things."

Student 2. M. - M. is listening to the lecture. She raises her hand, but is not called on. She watches as the other students contribute while her hand is up, and she is attending. Later, she is looking at the floor. The next time I observe her, her hand is one of seven waving in the air. The teacher calls on her. She is responding to another student who had suggested that companies could save money by firing workers. "If you are living with a single parent, and that parent is fired, it will be a hardship for the family." I

counted her hand up three times before the class ended, and she was able to respond briefly once.

During the interview, M. reported that the lesson was "useful, real important. You can get a job from the guys and work there." She was trying to figure out why the Japanese want to sell stuff in the U.S.A. She summarized the lesson by stating: "It was fun, exciting and a lot of fun talking about it. It was interesting. We learned how Japanese--they make more machines and have a lot of robots instead of people."

Student 3. Te. - Te. listened to the lecture, held his hand up twice. Finally, he leaned his shoulder on the table, and supported his arm with the other hand. Then he continued holding up his hand without looking at the teacher. He seemed to be attending, but also using the pencil eraser to erase marks on the table. After having his hand in the air for a while, he was able to contribute a suggestion for reducing cost of a product: "Cut back on the waste." He continued holding his hand up for the rest of class period, changing his arms when one got tired.

During the interview, Te. reported that the class could help with his future: "If the Japanese come over or machines do most of the work, then it would be important for my future." When asked what he was trying to figure out, he responded, "What would happen if the Japanese did take over our commerce. Britain is

taking over the shoe industry." He summarized what he got out of the lesson with the following comments: "The Japanese and British can make things cheaper and whether we will put a tariff on it. Because it will make imported goods the same price as ours. So cheaper things will not be bought."

Student 4. A. - Through the first part of the period, A. listened to the lecture with lackluster expression. About fifteen minutes later, she started to look at the Junior Scholastic. Later she appeared unengaged, and my last note records her looking at the floor seemingly pre-occupied with her own thoughts. She was the only student of the five I observed who did not raise her hand once.

During the interview, A. claimed that the lesson was useful ". . . cause I'll know what taxes I'll have to pay . . . where the car comes from when I get it." She was trying to figure out "how they build the cars. We have the parts and are sending them over and they build them. Why don't they send more equipment or let us build them down here?" When asked to summarize what she got out of class, she replied: " The differences between the two countries - the taxes, the way of trading, education, machinery . . . are all different."

Student 5. T.J. - T.J. had his hand up almost as soon as the class started, and almost throughout the class period. He was called on by the teacher seven

times during the hour. His first contribution was to point out that some parts of Japanese products sold in the U.S. are made in the U.S. In response to a request for information from the Junior Scholastic, he responded that if the Congress passes the tariff it will cost more for Japan to send their products to the U.S.A. Later he was able to predict consequences: ". . . if we raise the tariff so will they." He responded to the teacher's request for solutions: "I'd try to limit how much they are sending to us." In the part of the lecture dealing with the areas in which we can compete, he suggested that since Japan builds little cars, and people are having bigger families and wanting bigger cars, we should build the bigger cars, and let Japan build the little cars. His final comment helped elaborate the teacher's explanation that the industrial robots are more like machines than little mechanical men. He added: "not robots, just arms."

T.J. was engaged through out the hour and was by far the most active student. The teacher helped him to achieve this role by repeatedly recognizing his hand.

During the interview, T.J. reported that the lesson was useful. "It tells me that people in the U.S. don't like other countries trying to sell us out. It gave me a feeling that I should help more with this subject." During the class he was trying to figure out why they were trying to beat the U.S. in the economic

race. He felt that during the lesson, he had learned a lot about economics and "what countries do and try to do to us. They try to sell us out and more people in the U.S. buy cheaper things."

The analysis of this class focuses on whether the teaching behaviors were consistent with those prescribed by the model, and whether the students' behaviors might have been predicted from the teaching behaviors. Knowing that the students had previously been trying to attract a branch of Apex Industries to Canada and watching the teacher build on that experience, it appears that students had an opportunity to become imaginatively engaged with the problem, to identify some of the issues to be resolved and to have felt that resolving the issues was important. Still, the problems of international trade might seem relatively remote to the interest of young adolescents. From the observations, the teacher appeared to own the problem and had planned a sequence of sub-topics which would open up the problem for detailed examination. Much of the questioning did, indeed, seem designed to help students make transitions into deeper levels of analysis, rather than simply asking for recitation of facts; i.e., "If our number one export to Japan is food, and they retaliate by putting higher tariffs on our things, who gets hurt?" Still, students had little opportunity to develop their own line of reasoning beyond the initial contribution made to the class discussion. Students were not generating tentative ideas and using resources to confirm or elaborate these ideas. There were no apparent

plans for personalized projects to sustain and extend individual lines of inquiry.

The post lesson interviews revealed a range of responses. Three of the five students retained fragments of the lesson rather than organizing ideas and concepts which would provide an informed perspective on Japanese-American trade relations. One student apparently confused tariffs with taxes in general and during class her thoughts moved from cars as a representative of competitive imports to the time when she would have her own car.

On the other hand, one week after the class, student 3, who had spent most of the class with his hand up, was able to summarize succinctly the threat of imported goods underselling products made at home, and the function of tariffs in combating the problem.

The responses of Student 5 during the interview are particularly interesting. From the classroom observations, he was obviously engaged, interested and interactive throughout the lesson. During the interview, however, his responses were general, vague, and imprecise. It is clear that the lesson had stirred feelings that still persisted: "It gave me a feeling that I should help more with this subject." When the interviewer probed to see what he might do, he responded: "Like picking up litter and keeping the streets clean." This response suggests that the residual of the lesson was concern over the sinking image of the United States in the eyes of the world and a feeling of personal responsibility to improve that image.

It might be possible to work backwards from the responses of student 5 and ask what conditions in the class might have moved this student more certainly into the conceptual content of the lesson. This raises the further question, what was the reality of the class itself? The first observer reported a high level of interaction and discussion with much apparent input from the students. The second observer reported a series of mini-lectures punctuated by brief interludes of student talk. But to focus on such features is to make the same unconscious assumption that teacher Cathcart made in the example presented by Brickhouse, i.e. that active engagement of students in the instructional activity can be taken as an index of good instruction independently of the role of that engagement in the conceptual processes of the learner. Given student 5 as the most visibly engaged and active student in the room, a series of sharply defined questions could be asked from the perspective of the model: What about the lesson mobilized his feelings and left him with a sense of being personally connected to the problem? What activities during the lesson helped him construct a sense of problems, paradoxes, and discontinuities which would have to be resolved? Did he have an opportunity to think about these difficulties and generate some tentative ideas about solutions? What opportunities were afforded for checking, confirming, discarding and reformulating these ideas in the light of new information from resource materials? The model asserts that where these opportunities are largely absent from an instructional encounter, we would have little reason to expect

students to construct broad concepts or to reorganize the way they think or believe.

After reading the description and analysis of her class, Teacher A. remembered being frustrated by the requirement that the demonstration lesson show the whole model from start to finish in 50 minutes. She felt that the work on the Canadian regions did leave the children with some large and lasting concepts, but the lesson on international trade "was more contrived than I would have liked it to have been." The teacher also commented on the number of times T.J. was recognized. "If I remember it correctly, this was the first time that this student was really coming forward in the discussion."

Teacher B.

Mr. B.'s class began with a debate on the Death Penalty. Students were to consider, "Does the punishment fit the crime?" Two students gave pro arguments, two gave con arguments. The students had obviously researched to incorporate some statistics into their emotional pleas for the causes for which they stood. Some of the arguments put forth by the two sides were:

PRO	CON
1. Cost of maintaining prisoners.	1. Is money more important than a human life?
2. Killer should consider the consequences before acting.	2. Bible says not to kill.

Following the presentations by the debaters, Mr. B. questioned the class, for example, "What kinds of questions do

you need to ask and think about when you try to make your decision?"

Mr. B. then described a hypothetical situation to the students to encourage them to test their thoughts on the death penalty: A son (or daughter) waited for the father to come home so he could shoot him because he had been physically abusing the members of the family. The teacher then asked two questions:

1. What would be a fair punishment?
2. What will prevent him from doing it to someone else?

Student questions added new complexities to the problem. For example, a student asked, "What if someone kills someone and really didn't mean to do it . . . or if someone is convicted and it's the wrong person?" After more questions and discussion, students were divided into groups arranged by the teacher. The four debaters were appointed as the small group leaders and each group assigned a task:

1. Develop alternative plans other than the death penalty.
2. Determine at what age is the death penalty o.k.
3. Write a letter to Governor Orr pleading for a reprieve for your son who has been convicted and sentenced to the chair.
4. Write Governor Orr's response and tell why the son cannot be pardoned.

Following the small group sessions the leaders of the groups reported to the class.

Even though the teacher maintained control of the "steering wheel," the students did have a chance to look into a variety of options. The debate helped students develop a sense of the problem, and they did have a few opportunities to explore some of their ideas.

The teacher, through his questioning, was able to help the students establish some general ideas as they worked to integrate a variety of viewpoints. Many of the decisions involved in sorting out opinions on capital punishment were based on consideration of cause and effect relationships. Others seemed to revert to an "eye for an eye" rationale: "If they take a life, why can't we take theirs?" and, "If I'd kill Kelly, then Kelly's mother could kill me." Some students rejected the "either-or" alternatives. When discussing a 26-year old drug addict who killed a liquor store owner he was robbing, one anti-death penalty debater stated, "he should be taken to a Koala Center" (drug treatment center).

Many of the situations put forth by Mr. B. permitted students to re-evaluate their opinions, thoughts and beliefs. Constitutional rights even entered the discussion on both the pro and con sides.

The teacher obviously had carefully chosen his debaters to carry the class through the confrontation. The topic was of interest to the class as a whole. The teacher guided the lesson through planned stages and topics which had been chosen previous to the class session. Individual student concerns were addressed during the sessions. There were also indications that students

would have opportunities to further investigate particular areas of interest during the next several class periods. Mr. B. mentioned that students might want to write letters to the state penitentiary to find out the actual cost of keeping a prisoner on death row.

The debaters had a lot of preparation from materials Mr. B. had provided them (personal library, school library). During the debate and class discussion, the debaters and Mr. B. served as resources. These debaters led the discussion groups and were able to share their findings there as well when questioned by other students. Mr. B. provided several additional readings (which he had laminated) to the small groups. The materials provided information relevant to problems under discussion rather than already developed solutions.

From this description, it should be evident that Mr. B.'s teaching strategy conformed rather closely to the behaviors suggested by the instructional model. Through identification with the debater, other students should have been motivated to take sides or to cope with some of the issues that had been made explicit through the debate. Students were placed in the position of using the information presented in resolving a problem. The teacher's questions encouraged students to consider the problem at deeper levels, and some resource material had been assembled, laminated, and distributed to assist students in testing and extending their ideas. How did the students respond to these arrangements?

Student 1. T.G. - Attending to students presenting debate on the death penalty. Seems to be laughing at some internal joke, or is he simply nervous about something? Chewing pen. Holds up hand during class discussion but is not called on. Looks at other students and laughs when a classmate suggests that the mother of a victim should kill the killer. Is called on by the teacher and asks a question: "What happens if a person is found innocent after baing executed?"

The class is divided into four groups, each with an assignment. T.G. is in the group trying to develop alternatives to the death penalty. He spends the initial part of the group time reading material on the issue from the Junior Scholastic. I was unable to monitor closely his actions during remainder of small group work.

T.G. attended to the student speakers making reports from each group. On the whole, he was as attentive and as engaged throughout the class as were the other students. Based on his expression while listening and the quality of his response, I felt that he had the potential for greater engagement and participation.

The interview with T.G. indicated that during class he was deciding whether people should be given the death penalty or not and the cost of keeping offenders in jail. Despite the attention shown in

class, the interview material suggests that he was not deeply engaged. When asked, "What were you trying to figure out," he responded, "I don't know, I was just going along with everyone else." Later when asked, "What was the hardest thing you were trying to understand?" he responded, "I don't remember, Everyone was answering all the questions. I didn't have to think." He was still concerned with the question he had asked in class, "What would happen if a person got the death penalty, was actually killed, and later found to be innocent?" Yet, he summarized what he had learned from the lesson as "How much money it takes to keep them in prison . . . lots of money."

Student 2. B.K. - B.K. attended to the debaters but displayed little outward enthusiasm. During the subsequent discussion, she did not seem too attentive and frequently did not look at the student making a contribution to the discussion. She raised her hand, was called on, and commented that the appropriateness of the death penalty depended on the reasons for the killing. The teacher recognized the comment as an important contribution to the discussion. As the discussion continued, B.K. looked abstractly at the chair legs of the next row.

B.K. was assigned group 4, the Governor's letter denying clemency, and was the only member of her group looking at the Junior Scholastic while the leader wrote

the letter. While she did not seem to attend closely to the student speakers, she did ask a question: "What if some kid 5 years old commits a murder?"

During the interview, B.K. reported that she was trying to figure out if the death penalty was right or wrong and why people felt differently about it. She reported that the hardest thing to understand was why people felt differently and summarized what she got out of the lesson with the statement: "People have different feelings because of religion and Bible and magazines."

Student 3. K.W. - K.W. is usually a little late since he comes in from an LD room. Today, he was on time for the debate. He sat on the front seat of one of the rows and was the only student being observed whose face I could not see. However, I noticed that during the debates he was distracted from time to time by watching our camera man who was video taping the lesson.

K.H. was in the small group examining the age at which the death penalty might be considered appropriate. He exchanged a couple of comments with the student next to him but appeared to be sitting waiting for something to happen. He did not attend to the student speakers when the small group reports were made. He became preoccupied with setting his digital wrist watch while the group leaders reported. Near the

end of class, he held up his hand, was recognized, and offered the idea that a person might have accidentally killed someone when his gun went off. At one point during the observation, the teacher commented that this was K.H. at his best.

During the interview, K.H. indicated that it was interesting to learn about the death penalty, but he was not trying to figure anything out. He was thinking about why or why not to have the death penalty and summarized his gains from lesson as "learning about the death penalty and how and why you get it or why you just get prison and how someone gets on death row."

Student 4. K.C. - K.C. started out attending to the debate. As the debate proceeded, her posture became somewhat more "laid back," chin resting on a fist supported by the desk top. Near the end of the short debate, her eye lids lowered and she appeared sleepy. As the classroom discussion got underway, she inspected her finger nails. At the next sweep around, I found her with head bowed looking at the closed book on her desk while the other kids in the class volunteered ideas. Next, she occupied herself by taking off and then replacing her blue denim jacket.

In the small group working on alternatives to the death penalty, she spent her time reading and talking to C.B. She attended to the student speakers during the reporting period and raised her hand during the

discussion, but hardly seemed interested. Her hand remained up for a considerable period, but she was not called on to speak.

During the interview, K.C. reported being curious about the cost of sending someone to prison, and trying to figure out why people had to die for doing something bad. She also thought about what people go through when they are put in prison for life. Her summary of what she got out of the lesson: "If you didn't do something, don't tell the police you did or you might be put in prison for life."

Student 5. C.B. - C.B. listened attentively to the debate and in the discussion which followed she contributed the opinion that we should have the death penalty for murder, other wise the criminal would get out of prison and do it again. She looked at other students as they contributed to the discussion. Sometimes, she was the only one of the five students I was observing who turned to look when another student spoke.

C.B. was in the group trying to develop an alternative to the death penalty. She looked at the material, pointed out passages to K.C., talked to other group members and was actively engaged in the work of the small group. She attended to the students giving their reports of the small group work.

During the interview, C.B. indicated that, during class, she was curious about "If they are going to let a guy out instead of putting him in an institution. He might do it again." She was trying to figure out why they put people to death rather than locking them up. Her major question was what would happen if a person got out on probation and killed someone else. She summarized her learning from the lesson: "If I became mad or angry with someone, I wouldn't try to kill him. I'd try to keep it under control." Regarding the death penalty, she said, "I am more in favor of it than not. I don't know why. They shouldn't get away with it."

In summary, Teacher B. had a thought-provoking confrontation as evidenced by the variety of student-generated questions. As we will see later, following the confrontation with small group work can be an effective way to proceed, but in this case the teacher was not able to capitalize on the students' emerging questions. Instead, each group worked on predetermined assignments. Within these constraints, students were free to develop their own ideas. There was some indication that there would be opportunities for students to continue their quests in subsequent class periods, but no evidence that they did.

During the interviews the following week, students had difficulty summarizing what they had learned. Some students personalized the lesson rather than generalizing from it, i.e., "if I became mad or angry with someone, I wouldn't try to kill him," and "If you didn't do something bad, don't tell the police

that you did . . . ." There is evidence that most students internalized the issue of the death penalty but did not go on to develop well articulated positions.

Looking back at both classrooms, it is interesting to note that students' classroom behavior was not necessarily a good predictor of student cognitions as revealed by the interviews. For example, during the lesson on Japanese-American trade, student 3 who had spent a good part of the class with his hand up but erasing pencil marks on the desk top, provided a succinct summary of the problem of goods produced cheaper in foreign countries and the role of tariffs in equalizing the price with domestically produced products. For the lesson on the death penalty, student 5 was by far the most active student of those observed, listening attentively to other students, contributing comments, and taking the lead in the group work. Yet, in the interview she voiced the single concern that if killers were sent to prison, they might get out and do it again, and she summarized what she had obtained from the lesson by saying: "If you didn't do something, don't tell the police that you did . . . ."

Considering both teachers, there is a progression from Teacher A. to Teacher B. in the extent to which their behaviors correspond to the instructional model. Yet, there is little systematic change in the student responses which would suggest that deeper levels of information processing accompanied the different teaching behaviors. One is more impressed by the diversity and emotionalism of the student responses and the

superficiality of conceptual attainments than by the achievement of insights into the problems considered.

It seems important to note that even though the teachers worked to bring their teaching into closer correspondence with the instructional model, there was still considerable distance between the behaviors suggested in the model and the teaching behaviors observed.

The teaching and learning behaviors specified by the model may be best organized as an instructional sequence described by Thelen (1963):

1. Students are confronted with an experience which is emotionally and intellectually compelling and open to a variety of interpretations. The confrontation might be a field trip, dramatization, simulation, debate, film, or reading which is likely to generate opposing viewpoints.
2. Following the confrontation, each student, working alone with the material or reflecting on the experience, develops a point of view, a reaction, or an interpretation.
3. In small groups, students share with each other their perceptions and interpretations.
4. Reports from small groups make explicit differences in interpretations and foreshadow possible explanations.
5. "Problem posting" develops a list on the blackboard of the major positions taken by group members and some of the possibilities that can be explored in evaluating one position or point of view over another.

6. An agenda of work is generated from the problems posted and different aspects of the problem are assigned to various work groups.
7. The groups do their work and report back to the entire class, both what they have found out and how they went about pursuing the problem.
8. Individual projects are negotiated between students and the teacher in order to pursue in greater depth some aspect of the problem or a new problem that has emerged.

This sequence may cover several class lessons, and represent cycles within a larger instructional unit.

It seems important to recognize that many of the teachers have been successful in incorporating some components of the instructional model into their teaching. Given the short duration of the project and the magnitude of change in instructional strategies suggested by the model, it should not be surprising that few of the teachers were able fully to implement the instructional model in their demonstration lessons. From this point of view, it may be premature to attempt to assess the impact of new teaching strategies on students' cognitive development.

Will it matter if teaching strategies never fully reflect the model? We think it will. If a student in shop sets out to build a bird house, it doesn't do to draw a design, lay out the tools, assemble materials, then put everything away and turn to a study of house planning. At some point, the student has to saw a board and drive a nail. He has to finish his product.

It seems to us that the instructional activities specified in the model work together to facilitate cognitive growth. The model suggests teaching behaviors which are logically related to the conditions which stimulate conceptual change. Any specific teaching behavior is viewed in terms of its effect on other components in the model.

Again, our emphasis is on integrated patterns of instruction rather than on cultivating a few specific teaching moves. As Joyce (1985) notes, ". . . strategies for thinking do not come in fragments. We can't teach their elements as isolated skills . . . . Thus, the teaching of thinking requires a commitment to solid instruction in the models of teaching that engender those types of thinking and the willingness to persist until students become effective in their use" (p. 7).

Student autonomy

The observation of Joyce raises a related question: to what extent can we expect students to make an abrupt switch in their roles? Some of the teachers in our project who have experimented with new teaching strategies have found that the children were uncertain or unskilled in meeting new expectations for autonomy. It occurred to us that we had concentrated so hard on working with teachers that we had completely neglected any efforts to help children gain new perspectives on classroom learning.

In order that children might see autonomous learning behaviors modeled, we produced a series of video tapes under the title, The Sandhill Cranes (McDaniel, 1987). The tapes are built around a field trip taken by a middle school class to the Jasper-

Pulaski Wildlife Preserve to see the hundreds of cranes arriving and departing from this resting spot on the annual trip south. There are three separate tapes:

1. Asking Questions (8 minutes). The children are seen arriving at the site and excitedly observing the birds. While still in the field, the teacher asks the children to write down some of the things they have observed and questions they might have. Children are then seen in small groups contributing questions to a group leader. The group leaders then report the questions of their group to the larger class, for example: "How big are they? Where are they going? What color are their eggs? Why do they fly in pairs?"

2. Seeking Information (13 minutes). The children are seen in the library using the card catalogue, the reader's guide, and the vertical file to locate sources of information. They are seen fanning through the library, inspecting materials, quickly discarding some as irrelevant and taking others to their group table for closer inspection. They leaf through pages, use the table of contents and the index in search of material on the Sandhill Cranes.

3. Making connections (14 minutes). In small groups, the children concentrate on the actual content and share with each other their findings. There is evident satisfaction as children make connections between the content and their own experience. They find out how big the cranes are and see the color of their eggs. Later, each small group shares their knowledge with the larger class in a simulated "talk show."

The tapes are designed to be viewed and discussed by children as a preliminary to their own learning units. There is no narrative or voice-over on the tapes. The teacher is almost totally absent. Children viewing the tapes and discussing them (What did you see? What did you notice?) might be expected to observe that children came up with their own questions, knew how to find materials without help, made their own selection of materials, and decided independently what content was relevant to their questions. They might also note that a major outcome of the lesson was satisfying their own curiosity and sharing their findings with others.

Each tape is accompanied by a pamphlet for the teacher with the general title, Helping Children Take Charge of Their Own Learning. Part I, Asking Questions, helps the teacher see how small groups can be used to help children share perceptions, form common questions, select questions they want to pursue, and divide tasks and organize work. Part 2, Seeking Information, helps teachers see the role of the student's purpose in making choices, planning, and carrying on activity from moment to moment. The library search seems to flow naturally from the desire to learn more about the giant birds which the children have observed, and there is a sense of certainty and decisiveness in selecting information. Part 3, Extending Connections, helps teachers see that information plays a valuable role in learning when it makes connections with the child's experience. It builds on Dewey's message: "Mere amassing of information apart from the direct interests of life makes the mind wooden; elasticity

disappears." The Sandhill Cranes shows children enjoying the process of using information, constructing their own explanations, and extending their own experiences.

These materials were completed too late in the project to have a field trial. Nevertheless, we feel that these materials represent an important new thrust into the area of preparing students for participation in the kinds of study units which stem from the instructional model. These materials will be used as Twin Lakes teachers continue to work with the model, and they will be available to teachers and researchers in other areas doing similar work.

Other Data Relevant to Project Outcomes

To what extent did teachers change during the course of the project? To be sure, teachers experimented radically with their own teaching processes in the construction and teaching of the four demonstration lessons. To what extent did changes permeate their typical classroom procedures?

To examine this question, we re-administered a student survey which we had used during the initial year of the project to collect base line data about teaching behaviors. The survey asked students to respond "yes" or "no" to specific teaching behaviors, i.e., "The teacher asks us about our ideas." The survey was administered to the social studies classes of all teachers participating in the project. The results of the pre and post comparison are shown separately for each grade level in Table 3.

Table 3
Percent of Students Responding "yes" to Each Item of Pre and Post Project Survey of Teaching Behaviors.

Item	Grades:	5		6		7		8		11	
	Administration:	pr	pt	pr	pt	pr	pt	pr	pt	pr	pt
busy learning from the text		63	60	78	45	63	74	80	79	58	69
discuss a lot of different things		94	99	94	90	71	69	96	84	90	99
things we study are interesting		71	77	63	66	26	43	60	56	65	61
talk a lot about the topics		81	97	83	95	59	78	86	88	81	91
teacher interested in our opinions		88	88	88	72	61	61	70	61	83	97
have to explain why answer is good		61	85	58	78	44	67	57	86	79	60
discuss things not in the text		81	94	80	91	74	68	82	82	96	98
have to memorize a lot		23	22	27	68	29	31	23	18	35	29
study things uninteresting		42	38	52	59	73	71	58	59	49	63
teacher likes the ideas we come up		86	85	66	61	46	51	57	52	66	86
do our work in small groups		64	92	46	75	46	51	40	83	50	75
we help plan what we will do		59	39	49	31	47	13	20	20	29	26
everyone get to speak up		74	85	87	91	63	67	83	77	90	95
teacher asks us about our ideas		81	80	77	57	50	46	54	64	80	92
whatever text says is right		42	53	52	67	45	59	64	67	50	56
we listen to each other		89	86	84	69	35	61	69	72	75	71

pr = pre

pt = post

The data in Table 3 show remarkably stable percentages. While there are occasionally very large differences on a single item at a particular grade level, they tend to be isolated and do not suggest a pattern. There are, however, two items that consistently show a larger percent of students responding "yes" than during the base-line year:

Item 6. "We have to explain why we think an answer is good."

For this item, there were gains ranging from 20 to 29 percent in the number of elementary and middle school students responding "yes." At the high school level, there was actually a decrease in the proportion of students responding in the affirmative to this item.

Item 11. "We sometimes do our work in small groups."

For this item, gains of 5 to 29 percentage points were made for all grades from the elementary to the high school level. At the high school level, there is a pattern of increased frequencies for responses to the two items, "The teacher is interested in our opinions," and "The teacher asks us about our ideas."

All of these gains are consistent with the emphasis on thinking processes and class organization emphasized during the past three years. Some changes suggested by the data are less consistent with project goals. There seems to be less emphasis on student planning ("Sometimes we help plan what we will do in class.") and more of a tendency to view the text as an

authoritative source ("Whatever the text says is counted as the right answer.").

The total score on the student survey did not show any systematic relationship with grade level; i.e. there is no evidence that teaching behaviors became more or less satisfactory with respect to the dimensions measured as students progressed up through the grades.

We factor analyzed (principal components with varimax rotation) the student survey and found that factor 1 accounted for 25 percent of the variance. The 10 items comprising this factor are shown in Table 4 listed in order of their loadings.

Factor 1 clearly seems to measure teacher interest in student ideas coupled with an emphases on classroom discussion. It would seem that teachers who are teaching in ways consistent with the instructional model would exhibit the behaviors measured by this portion of the student survey. Does interest in student ideas and class discussion lead to more positive orientations to learning? To help answer this question, we administered to all students three instruments designed to measure orientation to learning.

1. Task Involvement This is a nine-item subtest from a larger questionnaire designed to measure achievement motivation (Nicholls, in press). The items in this subtest measure involvement in school tasks, i.e., "I have had a good day in school if I solve a complicated problem." High scores indicate an interest in understanding the material rather than simply working for a grade.

Table 4

Items and Loadings for Factor 1 of Student Survey

	Item	Loading
5.	The teacher is interested in our opinions.	.77
10.	The teacher likes the ideas we come up with.	.70
13.	Everyone gets a chance to speak up.	.64
2.	We get to discuss a lot of different things.	.63
14.	The teacher asks us about our ideas.	.59
4.	We get to talk a lot about the topics.	.57
16.	We listen to each other when we are discussing.	.53
11.	We sometimes do our work in small groups.	.47
7.	We discuss things that are not in the text.	.40
3.	The things we study are interesting.	.31

2. Purpose of School. This is another subscore of the Nicholls' instrument. It consists of three items measuring the extent to which the purposes of school include ability to view news critically, analyze political positions, and take an active role in our democratic society.

3. When I study history . . . This is a sentence completion task scored to indicate the level of intellectual engagement with historical content. Responses are scored on a three point scale ranging from dislike or boredom with history to an imaginative engagement with the subject matter and an attempt to develop personal meanings from the material. Examination of the means of each of these instruments administered in grade 5 through 11 revealed no grade level trends.

Correlation coefficients were computed between Factor 1 of the student survey and the three measures of learning orientation. The results are shown in Table 5.

Because of the very high number of cases, all of the correlation coefficients are significant beyond the .01 level. These correlations indicate that there is a positive relationship among the students' perceptions of their teachers as being interested in student ideas and discussion of ideas, and a tendency to find satisfaction in the intellectual challenge of school work, to perceive the school's purposes as development of a critical stance, and to become more deeply engaged in the subject matter of history. We can not claim that these learning orientations are caused by the teacher characteristics described. It is quite possible that students with high intellectual

Table 5

Correlation Coefficients Between Factor 1 of Student Survey and Three Measures of Learning Orientation (n = 812)

Measure of learning orientation	Correlation coefficient
Task involvement	.32
Purpose of school	.20
When I study history...	.17

orientations tend to see their teachers as more idea centered and discussion centered than students with lower intellectual orientations. It is important to remember that the measures of teacher behavior are the perceptions of their students as indicated by responses on the student survey. Even with these cautions the data do point to relationships between teaching process variables and students' orientations to learning. Emphasis on discussion and interest in student ideas seems to be associated with students' motivation to seek understanding in school content. These findings are consistent with the assumptions of the instructional model.

These data encourage us to continue to work toward experimental manipulation of teaching strategies and to renew efforts to find dependable measures of student outcome variables. In this connection, we have been working with support from the American Honda Foundation to develop measures of student autonomy and of students' thinking processes. Two instruments which are nearing completion are described below.

1. Learning Behaviors Check List (McDaniel & Ferreyra, 1988).

Based on a review of the literature on student autonomy, a 15 item check list (Table 6) was developed for use by teachers in rating students on behaviors believed to represent student autonomy. The items describe behavior related to inquisitiveness, individualism, independence, resourcefulness, involvement, and ability to work without structure and approval: i.e, "Requests opportunities to study self-selected topics." Based on knowledge of the student's class behavior, the teacher

Table 6

Items for Checklist of Learning Autonomy

1.	Seeks to clarify ideas in the material studied.
2.	Uses books and magazines to pursue own interests.
3.	Requests opportunities to study self-selected topics.
4.	States own opinions even if they are not popular.
5.	Would be lost if not given formal instructions.
6.	Seems to need your approval when doing assignments.
7.	Is bothered if not allowed to pursue interests.
8.	Tends to be individualistic, not a follower.
9.	Wants to make more use of information given to him
10.	Offers reasons and examples for opinions.
11.	Sees that a question may have more than one answer.
12.	Is disturbed by changes in regular procedures.
13.	Likes topics that are open for interpretations.
14.	Seems resourceful in finding information.
15.	Asks for "hints" but doesn't want actual answers.

rates students on the items using a three point scale: "rarely," "sometimes," or "frequently."

2. The Holocaust (McDaniel & Thompson, 1988). "The Holocaust" is a prototype exercise designed to measure thinking processes. The exercise consists of a 14 minute video tape and four pages of reading about the virtual destruction of the European Jews by the Nazi government of Germany during World War II. The film provides some of the historical background, describes the campaign of hate and harassment of Jews developed by Hitler, and leads to scenes of the concentration camps. The printed material elaborates some of the major themes introduced in the film.

Students write brief answers to five questions which provide opportunities to organize and use the material in their own way; for example, "Could a tragedy like this one happen again? What are the reasons for your answer?"

Responses are scored on a continuum of cognitive complexity. At the lowest end of the scale are responses which state a simple "either-or" position with no supporting facts or details. At the upper levels of the continuum are responses which consider various possibilities and relate these possibilities to causal conditions.

Two eighth grade teachers completed the Learning Behaviors Check List for each student while the students were working on the Holocaust exercise. In general it required less than a minute to mark the check list for a single student.

We were particularly interested in the relationships among measures of student achievement (Iowa Test Battery, end of

semester grades in history), thinking processes (The Holocaust), student autonomy (Autonomy Check List), and orientations to learning (Task Involvement, When I Study History . . .). The correlation coefficients among these variables are presented in Table 7.

All the above entries are significant beyond the .01 level except as noted below. The correlations between Test Battery and Task Involvement (.15) and Holocaust and Study History (.15) are significant beyond the .05 level. The correlation between Test Battery and Study History (.13) is not significant.

In interpreting the correlation matrix above, we recognize that there are reasons to expect positive relationships among all the variables studied. They all relate to achievement and involvement in school work. On the other hand, the measures might be seen as representing two relatively separate aspects of adaptation to school: the achievement tests and teachers' grades reflecting factual knowledge, reading, arithmetic and other school skills; and the learning orientation tasks reflecting tendencies to understand and construct personal meanings from the material. The low correlations among the "achievement" variables and the "orientation" variables (the intersection of the first two columns and the last two rows of Table 7) would support the contention that such a dichotomy may indeed exist.

Accepting this dichotomy for the moment, what would we expect in the pattern of correlations between the Holocaust and the measures of orientation to learning? It would seem that if we are actually measuring thinking processes relatively

Table 7

Correlation Coefficients Among Measures of Achievement, Thinking Processes, Student Autonomy and Learning Orientation.

	Test Bat.	Hist. Grades	Holoc.	Auton.	Task Invol.	Study Hist.
Test Battery	---					
Hist. Grades	.67	---				
Holocaust	.45	.44	---			
Autonomy	.39	.60	.35	---		
Task Invol.	.15	.26	.26	.25	---	
Study Hist.	.13	.24	.15	.30	.32	---

independently of the amount of one's store of factual knowledge, we should see only a moderate correlation with scores on standardized tests. Correlations with learning orientation measures should be relatively high and those with teachers' grades might be even higher considering that thoughtful engagement with the content coupled with skill in reasoning with content would attract the teachers' attention. From Table 7 it may be noted that the correlations between the Holocaust and teacher grades are, indeed, moderately high but no higher than that between the Holocaust and the achievement test scores. The expected high correlations between the Holocaust and measures of the student's orientation to learning did not materialize.

The measure of student autonomy exhibits an interesting pattern of relationships. First, there is a very high correlation between student autonomy and teacher grades (.60), perhaps not too surprising in view of the fact that both indices are the teacher's evaluative ratings. The autonomy scale has moderately high correlation with both achievement tests (.39) and the Holocaust (.35). It is also significantly correlated with the orientation to learning measures (Task Involvement, .25 and Study History, .30).

The correlation coefficients discussed above are very encouraging. On the whole, they reveal a pattern of convergent validity among data obtained from disparate methodologies: standardized tests, teacher ratings, a thinking processes exercise, student self reports about their orientations to

learning, and external judgments about levels of engagement with subject matter.

The further development of the thinking processes exercise, with continuing support from the American Honda Foundation, holds high promise for providing an important criterion variable in studies of the relationship between teaching strategies and thinking processes. Measures of students' ability to organize and use information are likely to be most responsive to teaching strategies centered on students' use of content to construct and elaborate their own concepts. Research on instructional models designed to enhance thinking processes in content areas will be advanced by the appearance of research instruments suitable to the task.

Conclusions

In formulating parting observations and conclusions, it is well to remember that we have been discussing a many tiered project. At one level we have been occupied mainly with the validation and revision of an instructional model. At another level, we have been concerned with the problems of planned intervention, i.e., problems associated with encouraging and supporting change in teaching behavior. At a third level, we have been attempting to bring about changes in our own teacher education programs, changes which embrace the opportunities of collaborations between schools and universities in the interest of making teacher preparation more effective and more lasting.

We have been working toward these goals in a situation which is in some ways typical of many educational settings and in some

ways uniquely propitious. The setting was neither "university town" nor inner city. It was rural, agricultural, and mid-western. The school system was small enough that patterns of personal relationships tended to outweigh school defined roles. Because of the size of the system, all social studies teachers were part of the project, and their reactions and participation was almost always the reaction of a small social set, a pair of teachers, a clique, a team, but hardly ever a simple individual appraisal and response.

Probably few projects within a school systems could have the administrative support provided for this one. The superintendent did not simply permit the project to take place, he supported it with every means available to a superintendent. Meetings of university planners and principals were typically held in the board room. Principals were expected to take a leadership role, and they did. At times when the project reached critical points or crises appeared eminent, the superintendent moved in to review past progress with his teachers and point to new goals.

Finally, the project coordinator was chosen from among other applicants because of her teaching credentials, her unusual sensitivity to human relationships, her knowledge of the local school system, her organizational talents, and her deep commitment to project goals, a commitment which kept her working long hours beyond the half-time position for which she was paid. She was also the superintendent's wife. This fact---or artifact-undoubtedly added a subtle dimension to all interactions, a

feeling that one way or another the superintendent would know how one was responding to the project.

These elements do more than add human interest to the story. They help determine what of our experience might generalize to other settings and what must remain unique to the Twin Lakes/Purdue project. In terms of student characteristics, community setting, organizational structure and educational objectives, there was nothing in our setting that made progress toward project goals any easier or more difficult than it would be in most other educational settings. In terms of an intervention in a small, cohesive social structure where the interpersonal relationships went far beyond the role of classroom teacher, there was both explicit administrative support for the project and a subtle pressure for participation, a feeling that there was no place to hide.

Given this setting, what conclusions can be drawn, what hypotheses for further study have been generated, what lessons have been learned and what are the prospects for the future?

The model. There was little opportunity to test the model within a strict experimental research design. The implementation of the model was uneven and reminiscent of the old English Fable, The Magpie's Nest (Jacobs). According to the fable, all of the birds flocked around the magpie to see how she built her wonderful nest. "First of all I take some mud", she said, "and make a round cake."

"Oh, that's how it's done," said the thrush and off she flew, and that's how thrushes build their nest to this day.

Then the Magpie took some twigs and arranged them around the mud.

"Now I know what to do, said the blackbird, and off she flew; and that's how black birds still build their nests.

Then the magpie put another layer of mud over the twigs.

"That's obvious" said the owl, as he left, and owl builds his nest in this way to this very day.

By the time the magpie completed her nest, there were no birds around, and that is why different birds build their nests differently.

The instructional model, as an integrated pattern of instruction, is a complex of interfitting parts working together to move students into a considered interaction with information. Learning to teach in this mode may requires somewhat less preparation than brain surgery, but, it is still a difficult achievement. Our efforts centered on demonstration lessons, even though an instructional unit covering several days would have been more appropriate. Further, such instructional units would ideally be part of a course in which the major concepts of the subject matter had been identified, the model providing a framework within which the students could move toward these concepts.

The teachers in the project were unusually creative and imaginative in building confrontations to launch lessons, but the lessons frequently did not go on to open up lines of inquiry in which students probed the situation for deeper understandings with the help of prompts from the teacher and special resources

to help them proceed. This latter part of the model is partly illustrated by two middle school teachers who were affording their students such opportunities before the project was initiated and continuing to do so through a special fall event. These teachers have traditionally helped their students organize a fall "Pioneer Day" during which their students display the costumes, crafts, foods, medicines, and industries of the early pioneers. When the day arrives, students from the entire school as well as parents and members of the community visit this living museum. One boy with whom the writer talked stood behind the single item in his display, a black leather tankard. The report traced the origin of such drinking containers to the saddle makers and other workers in leather in the days of old England where the "Cordaswains" had incorporated into their names the Spanish town of Cordova, origin of the finest leathers, thus adding a implication of quality and prestige to their products.

"How did you get interested in this topic?"

"My uncle makes them.

It is unlikely that this student's knowledge will gain him a single point on the next standardized achievement test, and he may not be able to state explicitly what he learned in an interview. Yet, it is conceivable that this student and others feel more connected to the past, have, at some level, an awareness that today's cultural furniture has antecedents in the past, and have experienced the satisfactions of discovering some of the connections. We have not been able to demonstrate that

this happens when the model guides instruction, but we have accumulated no experiences which suggests that it does not.

Planned intervention. We have learned more about planned intervention. Changes in curriculum and teaching strategies are, at base, changes in people. The experience and beliefs of teachers, the available instructional materials, and the expectations of pupils, parents and other teachers combine to provide powerful support for existing classroom habits. There is an extensive and valid literature on staff development emphasizing the wisdom of a long perspective with ample time and opportunities for individuals to define their own problems and develop ownership of the solutions. The literature also stress the need to mobilize powerful supports in the way of training, facilities, sanctions and rewards which help direct and sustain innovations. Our experience does not contribute anything new to this literature, but it does confirm the major tenets.

The full story of this project would be the private story of each of the teachers participating in it, the reasons the project struck either a resonant or a dissonant note with them, their own assessment of their responses to the opportunities, expectations and demands of the project, their motivations to participate or abstain, and their hopes and aspirations as they help create their own futures. Curriculum development is staff development and staff development touches, not surface techniques in class management, but fundamental beliefs and commitments about teaching. One of the directors of the project is seeking

this fuller story through debriefing interviews with the teachers and principals.

In retrospect, it seems that a critical "missed step" in the staff development component was at the end of the second year. Teachers had been exposed to the model and had obtained some experience with it through the demonstration lessons. At this point, teachers electing to continue with the project should have been supported for a summer seminar focusing on an examination of their beliefs about education, redesigning their course and assembling new materials to support redesigned instructional units.

Teacher preparation. The reports of the Holmes Group (1986) and of the Carnegie Forum (1986) provide an excellent rationale for collaborative arrangements between universities and school systems for the more effective preparation of teachers. The logs of the university students in our project confirm the efficacy of combining theoretical issues and field participations in one integrated experience. Additionally, the articulation of a university course with the field experience changed the nature of the university course itself as lectures gave way to small work groups in which the professor and students designed and constructed instructional units to be tried out in the field. Reports of students who have gone on to student teaching suggest that the orientations to class planning have persisted at least into the following year.

A distinctive aspect of the collaborative efforts to prepare teachers is the emergence of teachers in the schools who

have partially assumed the role, if not the title, of adjunct professors. These teachers have come to campus to make presentations, received university students in their classes, and met with university professors to discuss objectives and plan experiences for university students. The evolution of this role and the development of reflective practica in which teachers, students, and professors jointly construct, analyze and test teaching sequences will be an important factor in realizing the potentiality of collaborative arrangements in teacher preparation.

The future. Will the past three years be a prelude to productive change, or an isolated episode in the lives of the participants? The answers to this question will depend on the same factors at all twenty-nine teacher education projects over the nation. For all projects, the future will depend on the decision makers at the local institutions, their commitment to preserving the working relationships which have been initiated and their ability to build into the institutional procedures the emerging roles on which collaborations depend.

The major achievement of our project has not been the substantiation of an instructional model, preliminary research findings, changes in teaching strategies, reorganization of a university course or new field experiences for university students. The major achievement of the project is that we have made a beginning. We have initiated a process within which important efforts to improve both instructional practices and teacher education are occurring. We have established working

relationships between a university and a school system which are characterized by tension, mutual respect, a sense of common interest, and a feeling that we need each other in order to realize our highest ideals.

Whether these relationships evaporate or coalesce into a working partnership depends on the ability of the concerned parties to institutionalize emerging roles and patterns of interaction. In the long run, it is unimportant that individual project directors are willing to invest beyond requirements, that individual project coordinators are excellent organizers, that individual teachers are willing to cooperate, or that an individual professor is enthusiastic about practical experiences. Personalities are transit. What matters is that a Director of Collaborative Relations is on the organizational chart, a field coordinator is a paid position with a job description, "adjunct professors" are a line item in the budget, and Reflective Practicum 505 appears on the schedule of classes regularly regardless of who teaches it. Such institutionalization reflects the priorities of the leaders and their determination to make it happen.

Maintaining an appropriate perspective is the key to evaluating progress to date. The beginnings of an enterprise rarely foreshadow its ultimate development. The small number of students who appeared for the opening of Harvard University, the few seconds of flight of the Wright brothers, the poor fidelity of the spoken message "Come here, Mr. Watson, I want you," barely foreshadowed the revolutionary changes which were being born.

Our experience has involved a few university faculty and a handful of teachers. Yet, the experience makes clear that collaborative relationships of value must be seen as growing over a long period of time, time counted in decades. Collaborations are labor intensive and expensive. They involve deep changes in human beliefs. They reflect slow developmental processes which can be worked out only within the stable framework of an institutionalized structure.

Collaborations hold hope for the improvements in teacher preparation envisioned by national reform movements. Such improvements include new visions of teaching and learning which will be formed and tested in local settings by teachers, professors and university students catalyzed by new expectations and supported by new infrastructures. What is needed are a few centers of collaborative efforts where the formation and trial of new approaches to learning are as routine and unremarkable as the daily roll call. Purdue and the Twin Lakes School Corporation, as well as others over the country, have launched such collaborations. Which ones will survive, mature, and make their contributions is a matter of the will and commitment of the decision makers at each location.

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Appendix A

STUDENT INTERVIEWS

PURDUE UNIVERSITY

STUDENT _____ DATE _____

TEACHER _____ TIME _____

INTERVIEWER _____

YOU REMEMBER THAT IN .....CLASS LAST WEEK YOU WERE LEARNING ABOUT .....

DID THIS LESSON GO ON FOR SEVERAL DAYS?

I HAVE SOME QUESTIONS I WANT TO ASK YOU ABOUT THIS.

HOW DID YOU LIKE LEARNING ABOUT THIS TOPIC?

SOME KIDS SAY THAT WHAT THEY LEARN IN SCHOOL IS NOT VERY USEFUL. WHAT DID YOU THINK ABOUT THIS LESSON?

Q: Well, how important was this material to you?

WHEN YOUR CLASS TALKED ABOUT ..., WHAT WERE YOU THE MOST CURIOUS ABOUT?

Q: What did you want to know the most about?
Q: Tell me more about that.

WHILE YOU WERE STUDYING THIS, WHAT WERE YOU TRYING TO FIGURE OUT ?

SOMETIMES IN CLASS, PEOPLE HAVE DIFFERENT IDEAS AND POINTS OF VIEW. DID THAT HAPPEN IN THIS CLASS?

If yes: TELL ME WHAT THEY WERE.

WHAT WERE YOU THINKING ABOUT DURING THIS LESSON?
Q: Well, what was going through your mind while this lesson was going on?

WHAT WAS THE HARDEST THING YOU WERE TRYING TO UNDERSTAND?
Q: What did you have to think hard about?

SOMETIMES, KIDS COME UP WITH QUESTIONS. DID YOU COME UP WITH SOME QUESTIONS ?

If yes: WHAT WERE THEY?

DID YOU EVER FIND THE ANSWER?

If yes: WHAT DID YOU DECIDE? Q: What was the answer?

HOW DID YOU ARRIVE AT THAT ANSWER?

COULD YOU SUMMARIZE WHAT YOU GOT OUT OF THAT LESSON?
Q: Well, if you were telling your mother in a sentence what you learned while studying ....., what would you say?)

If they describe activities: "Yes, that´s what you did, but what did you learn from it?"

..... TEACHES ..... TELL ME, WHAT DOES IT MEAN TO STUDY .....

Part III

Practice Profile

Twin Lakes / Purdue Enhancing Thinking Skills

Practice Profile

PROJECT DEMOGRAPHICS

Student Characteristics: University students involved in this project included students enrolled in ED 406, the Secondary Social Studies Methods course, and student teachers in the area of Social Studies. School district students involved in the project were enrolled in Social Studies classes from the fifth to the twelfth grades.

Teacher Characteristics: Teachers involved in the project were all teachers teaching Social Studies in the Twin Lakes School Corporation, grades five through twelve. School district administrators involved in the project included the Superintendent of Schools, his administrative assistant, and the principals of all six schools in the district. Purdue professors involved in the project included one from Educational Psychology, one from Educational Administration, two from Social Studies Education, one from Elementary Education, two from History, one from Psychology, and one from Philosophy. In addition there was an on-site coordinator paid from project funds. Numerous graduate students were involved with the project at various times over the 3-year funded period.

School/District Characteristics: The school district in which the project was carried out is a typical small Indiana district: one high school, one middle school, and four elementaries. The

district is characterized, however, by a progressive, active administration, which we considered very important.

Program Characteristics: The program integrates classroom teachers and building administrators into the methods courses, partly by bringing the school district personnel on campus to work with the college students, and partly by taking the college students on-site in the school system for experiences such as observation and joining with teachers to develop lesson plans and materials guided by an instructional model. Subsequent to this experience, as many students as can be placed there go to this system to student teach, in a structured format emphasizing the use of the instructional model.

IMPLEMENTATION REQUIREMENTS

Training: We suggest summer workshops in which teachers develop materials and explore teaching strategies; system-wide workshops during the school year; individual conferences based on planning, observation, and feedback of lessons. Costs will include stipends and transportation for summer workshops and released time for conferences (individual and off-site conferences) and transportation to the university; costs for the people running the workshops.

Materials/Equipment: We prepared printed descriptions of the instructional innovation, planning sheets corresponding to the tenets of the instructional model, newsletters each quarter, and training videos modeling desirable behavior. We also prepared video tapes of children going through the steps of the lessons in

order to model newer learning strategies for children. Costs included printing and filming costs.

Personnel: At a minimum, the project will require a project director (may be part time), at least one graduate student committed to the project, and a project coordinator. Costs included professorial costs for classes that will need to be covered and stipends and transportation for public school teachers working with university methods classes and student teachers.

Organizational Arrangements: The director of the program has to have administrative status within the university--otherwise, no program development will occur on campus. The project coordinator can expect to spend most of his/her time in the field, on-site. Stipend/perks must be determined for the cooperating public school teachers who are working with the methods classes and the student teachers, and reduced teaching loads must be arranged for public school teachers who will take on responsibilities in the project.

COMPONENT CHECKLIST

I. Organizing and Maintaining Partnerships.

Component: A. On-site coordination: liaison and communication.
Ideal: This role would be carried out by a full-time person working with site teachers and administrators, university personnel, and students in their field experience components. This person serves as both staff developer and adjunct professor. This person would be partially hired by the school district, partially by the university.
Acceptable: A half-time person in this position, paid either by the university or school district.
Unacceptable: Communication and coordination between university and school district is no one's specific responsibility.

Component: B. Recruiting of school district teaching personnel to assume a larger role in the university teacher preparation program.
Ideal: Recruiting teachers with a strong commitment to developing and studying innovative teaching strategies and curriculum materials and, in addition, with a high interest in initiating new teachers into the profession.
Acceptable: Recruiting teachers with an emerging commitment to curriculum innovations and open to new approaches to teaching.

Unacceptable: Recruiting teachers with no commitment to exploring alternative approaches to teaching and with little interest in working with university students.

Component: C. Provision of structured time for school district teachers to take on role of teacher trainer.

Ideal: Additional certified teachers are hired by school district so that teachers who are to work with university students are released from a portion of their normal teaching duties, to facilitate working with university students in the school district and on campus.

Acceptable: The school district schedule is restructured so that teachers who are to work with university students may be given as light a teaching load as possible, and excused from certain responsibilities, such as bus duty.

Unacceptable: School district teachers who are to work with university students do so on their conference periods and after school, and rely on released time with substitute teachers to enable them to come to campus.

Component: D. Fiscal and other resource sharing.

Ideal: University and school district work out agreement to share costs of engagement of school district teachers with university methods students (stipend for involvement, travel, materials, substitute teachers for released time, etc.). These costs become line items for each institution.

Acceptable: University and school district agree to share costs of engagement of school district teachers with university methods students on an ad hoc basis. No line items are established.

Unacceptable: Either university or school district assumes costs of engagement of school district teachers with university methods students.

Unacceptable: School district teachers are asked to volunteer to work with university methods students on their conference periods; appear in university classes without stipends.

II. Instructional Content

Component: A. Methods students are introduced to the instructional model and the concepts which underlie it.

Ideal: The model is presented by someone who knows the model thoroughly and can provide the in-depth rationale. Presentation is supplemented with video tapes of class instructions guided by the model.

Acceptable: The model is presented by someone who knows the model thoroughly and can provide the in-depth rationale. Presentation is supplemented with video tapes of class instructions guided by the model.

Unacceptable: The model is presented by someone with partial knowledge, thus opening the way for incomplete understanding and distortion.

III. Instructional Processes

Component: A. Teachers and administrators at the school district develop school plans for exploring teaching oriented towards thinking skills.

Ideal: Teachers design instructional units which span several days and culminate in individual or small group inquiry projects.

Acceptable: Teachers modifying presentations of text materials so that individual students select some parts for elaboration and personal inquiry.

Unacceptable: Instruction focuses on rote acquisition of textbook content; no emphases on conceptual learning.

Component: B. Student teaching experience oriented toward the goals of the project.

Ideal: Teachers, administrators, and university staff jointly design and deliver a student teaching experience oriented to thinking skills--goals, objectives, strategies.

Acceptable: Student teachers continue to explore with mentor teachers ways of engaging students in more reflective encounters with subject matter.

Unacceptable: Student teachers are reinforced in behavior directed toward classroom control and content coverage.

Component: C. Methods students and school district teachers team to develop lessons and materials oriented to thinking skills.

Ideal: Professors, mentor teachers, and university students form teams to explore boldly innovative teaching materials and strategies.

Acceptable: Professors, mentor teachers, and university students work together to make modification in existing teaching materials and strategies.

Unacceptable: Professors, mentor teachers, and university students form pleasant association where critical issues in education are avoided, no innovative procedures are attempted.

Component: D. Methods classes meet at least part time on site.

Ideal: All regularly scheduled methods classes meet at the site to facilitate joint planning, participatory teaching, observations and critiquing of instructional processes; joint discussions by teacher, students, and professors of teaching strategies and curriculum issues.

Acceptable: Periodical meetings of the methods classes are scheduled at the site to facilitate joint planning, participatory teaching, observations and critiquing of instructional processes. Site teachers visit campus to discuss teaching strategies and curriculum issues.

Unacceptable: University students visit site for observations and discussions so rarely that the experience has little effect on students emerging concepts of teaching.

Component: E. Team of university and school district staff jointly plan and deliver methods course.

Ideal: The joint development of course objectives, content and experiences by school district and university faculty.

Acceptable: The university faculty takes lead in defining the broad objectives and experiences with school district faculty helping identify and plan useful field experiences.

Unacceptable: Planning the methods course by university faculty without input from school district teachers.

IV. Student Evaluation Processes

Component: A. Tools to assess the students' conceptions of the ends and means of education.

Ideal: Structured interviews, essays, open-ended questionnaires, student journals, and other instruments that can be administered in a pre-test post-test control group design to assess the impact of the program.

Acceptable: Interviews, essays, questionnaires, and journals administered in a pre-test post-test design.

Unacceptable: Post-test measures focusing on memory for content covered in the methods course.

Component: B. Teacher observation scales reflecting the components of the model which can be used in micro-teaching, student teaching, and first year teaching situations to assess acquisition of teaching behaviors which are consistent with the model.

Ideal: The use of teacher observation scales as both formative and summative evaluation instruments extending through the first year of teaching.

Acceptable: The use of teacher observation scales for formative evaluation up through the period of practice teaching.

Unacceptable: No systematic efforts to evaluate behavioral changes of university students in the program.